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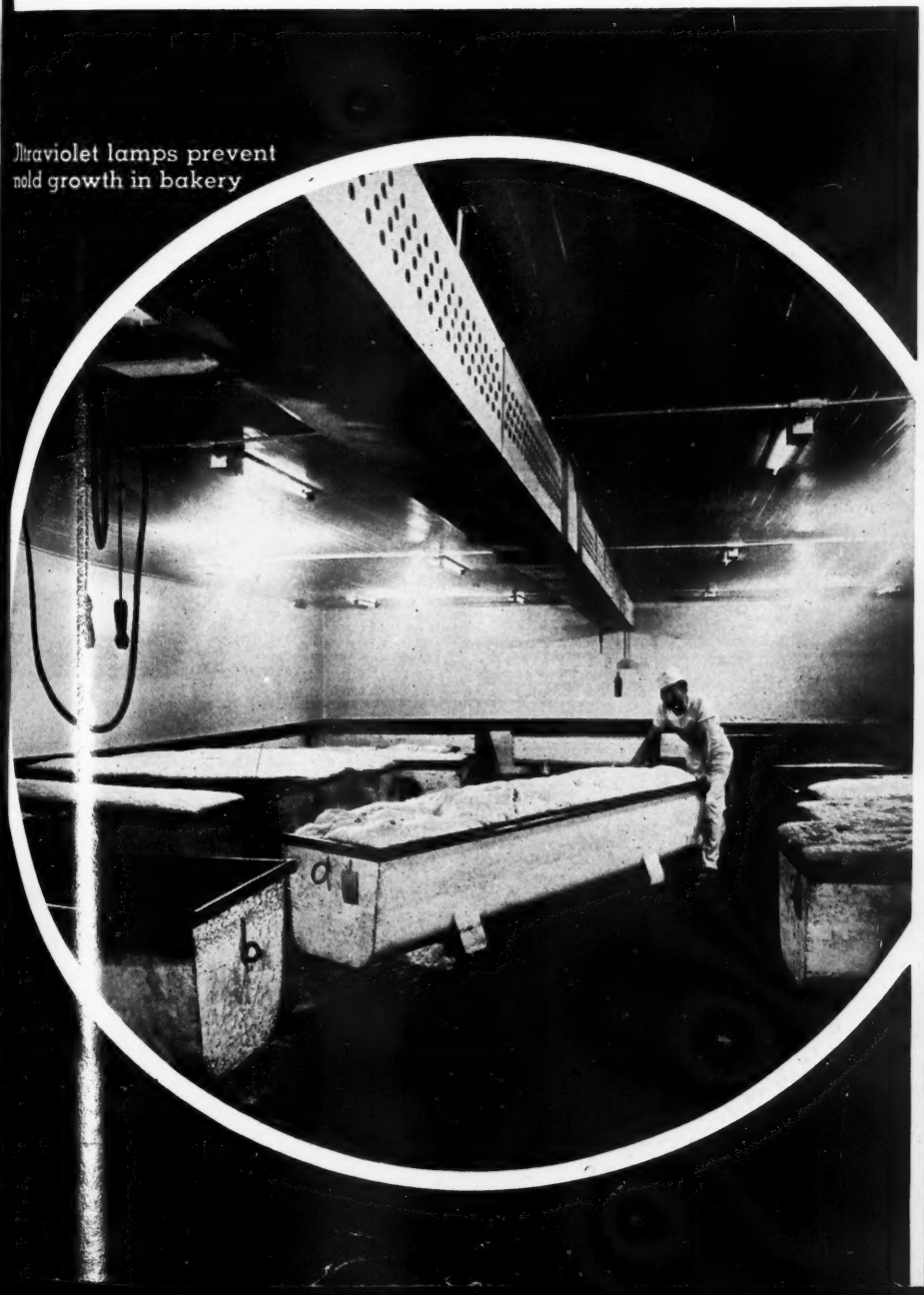
FOOD INDUSTRIES

• FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



Ultraviolet lamps prevent mold growth in bakery

MAY 1945

What Technology Means to Packers

Chemical Test Measures Shelf-Life

Froth Flotation Aids Canners

Good Particles Separated from Bad

New Know-How From Research

Screw Conveyor Made Into Freezer

Court Decisions In Food Cases

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Proof in Pictures.....
Another modern plant—The Borden Co., Baton Rouge, La.
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THE COVER

Possibility of mold growth in the fermentation room of Oroweat Bakeries, Los Angeles, Calif., is reduced by the ultraviolet radiation of 16 Sterilamps. These fermentation rooms usually are maintained at 90 deg. F. and a high humidity, conditions conducive to mold development. The lamps are arranged in four rows, 7 ft. apart in each row, and are at ceiling level.

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McGRAW-HILL PUBLISHING CO., INC., James H. McGraw, Founder and Honorary Chairman.

PUBLICATION OFFICE: 210 S. Desplaines St., Chicago 6, Ill. Return postage guaranteed.

EDITORIAL AND EXECUTIVE OFFICES: 330 West 42nd St., New York 18, N. Y. (Address correspondence here.)

BRANCH OFFICES: 520 North Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; 739-9 Oliver Bldg., Pittsburgh 22; Aldwych House, Aldwych, London, W.C. 2; Washington 4; Philadelphia 2; Cleveland 15; Detroit 2; Los Angeles 14; St. Louis 1; Boston 16; Atlanta 3.

JAMES H. McGRAW, Jr., President; HOWARD EHRLICH, Executive Vice-President for Business Operations; JOHN ABBINK, Executive Vice-President for Editorial Operations; CURTIS W. McGRAW, Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary, and J. E. BLACKBURN, Jr., Director of Circulation.

CABLE ADDRESS: "McGRAW-HILL, N. Y." Member A.B.P. Member A.B.C. Contents indexed monthly in Industrial Arts Index. Copyright 1945, by McGraw-Hill Publishing Co., Inc.

CREAMERY PACKAGE MFG. CO. OF CANADA, LTD.—TORONTO
1243 W. Washington Blvd., Chicago 7, Ill.

FOOD INDUSTRIES

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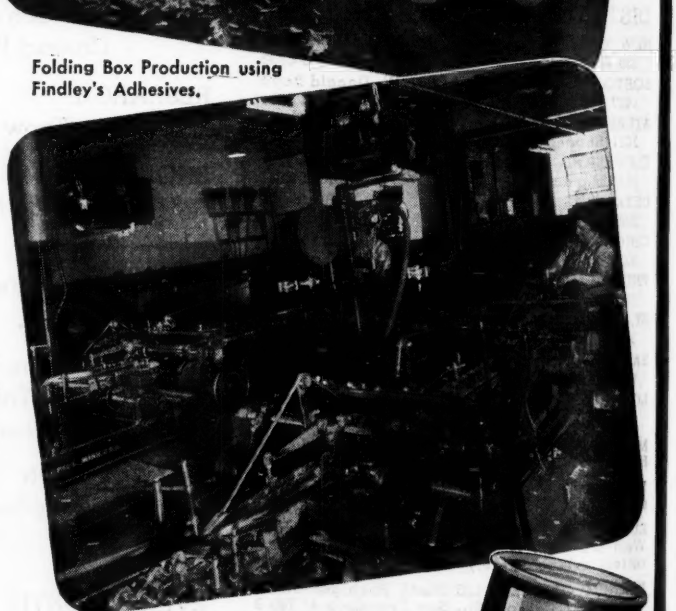

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Challenge to Small Business

SAFEWAY STORES, INC., recently announced a new buying policy that can have a profound effect on the operations of many smaller food processors. This large chain distributor plans to handle food products of small companies under the manufacturers' own labels—when the products meet Safeway's standards of quality—in addition to well-known branded merchandise. Naturally, there will be limitations on what items and how much can be handled, for consumer acceptance determines whether the item is profitable or not. When a small food manufacturer sells to this distributor under the new plan, it does not mean that he immediately achieves nation-wide distribution, but it does mean that he will achieve local or regional distribution.

Anyone who has ever attempted to peddle an unknown item to the independent retail trade is acutely aware of the difficulties involved and the individual sales resistances to be met. While it seems unlikely that the newcomer to the food manufacturing field will find the going any easier under Safeway's new policy, at least until he has proved that he has met one of Safeway's requisites—that he be an experienced manufacturer—it does appear that, once this criterion is met, he may have a somewhat broader path to the consumer than heretofore.

Two other criteria must be met: The product must meet certain standards of quality; the management must be capable. What do these really mean?

Any distributor has his own idea of what quality he wants to handle—but quality, as everyone knows, is very difficult to define. Safeway's recent move, avowedly to give aid to small business, should not be interpreted as a departure from previous good judgment. Nevertheless, any item purchased for resale will need to taste so good that: It will repeat; it will be better or cheaper than others of its class; it will not be merely an imitation of some other fast selling item.

Adequate Control of Quality Needed

The need for capable management is of special interest here, for it implies far more than ability to finance enlarged operations or to make deliveries as specified. In particular, it means control of quality and costs, for the larger the buyer the more critical he is. And products that vary from week to week will not meet his approval.

Small food manufacturers who fail to maintain their quality rigidly on the line will discover the urgent need to put in a quality-control department. And this may be the source of much internal anguish, for quality control means exactly that—*control*. It requires more than the control of things—moisture, pH, flavor, color, temperature and the like. It also involves control of the *actions* of people. To install a needed quality-control operation in some plants requires the utmost of tact—or else a major operation. If small business is to grasp the opportunity to grow, it must have good products of uniform quality.

Those in charge of quality control do not actually manufacture the goods, but they must know not only how but also *why*. Their decisions must be put into effect by the operating department, a fact which entails conferring the requisite degree of authority and establishment of suitable procedures to get results. They not only must be competent persons but they must be resolute souls and must be properly backed up by management.

Admittedly, quality control is not everything needed for success. The product must be right. Costs also must be right—below average. The new policy of the big distributor requires equivalent and reciprocal performance. Otherwise, the announcement that the size of a producer will not be a factor in marketing easily can become meaningless.

Same Selling Policies, Too

Despite all the foregoing matters within the province of the production manager, there are others to be considered. These are entirely within the province of the sales manager. Safeway has not become bighearted overnight without a reason—a seller's market. Every distributor wants more goods than he can buy. If the small manufacturer responds to the lure of big-time distribution by cutting off wholesale-retail outlets, he may be taking the initial steps toward postwar economic suicide. No more than 10 percent of sales to any single outlet is still a sound rule. Economic safety for any business, especially small food manufacturing, depends on balanced distribution through chains and independents. One need have no fears if his costs are below average and his quality is right.

L. V. Burton EDITOR

The Talk of the Industry

• THE mess in food planning is stirring Washington mightily. It went so far that during early April the White House had to take a hand. Top government officials were called in to explain to the late President and some irate Congressional investigators the why and wherefore of the situation. On the grill jointly were War Mobilization Director Fred Vinson, War Food Administrator Marvin Jones, Foreign Economic Administrator Leo Crowley, and OPA Boss Chester Bowles. Details of the executive conference were not revealed, but it was evident that an intolerable political situation was developing as a consequence of food shortages. And there is nothing else which stirs the White House and Capitol Hill into action quite so vigorously as something that is politically unfortunate with housewives, or other big groups of voters.

• OUT of this war and its shortages the conviction is growing that, when there is demand bigger than the supply of the commodity available, the brand is of lesser importance. Only when there is a supply ample to permit the public to choose and shop around is the brand—and all that it implies in uniformity or standard of excellence—important to the buying public.

• REPORTS just received from Australia indicate that the food front is still rolling along down under, but that the drought has materially reduced dairy and meat production. Canned vegetables will be less in one man's opinion, more in another's, the latter being optimistic because many plants which were under construction have been completed.

Every pound of food not produced in Australia for our troops in the Pacific area must be made up from our short supply in this country.

• OUTSIDE of a few reports that excessive ingestion of vitamin D is harmful, there has been little evidence that there is any harm from buying assorted vitamins in the drug store instead of eating them as they occur naturally in one's food. The only harm that appears to be possible is that they cost more when purchased via the pill or capsule than when innocently acquired via the groceries. We have to get them one way or another to preserve health. If people prefer to take a pill to getting theirs in the cheaper way it might stave off inflation.

Help Wanted

Urgently needed for important work for the Army are food chemists, food technologists or food engineers with experience in any phase of food processing and who now are in the military forces in either the European or Mediterranean theaters of operations. If you know of any such man, please notify us at once, giving the man's name, specialty, company where formerly employed and present military address. Don't delay. Write to the Editor of Food Industries, 330 West 42nd St., New York 18, N. Y.

• WORDS of wisdom from General Foods "Annual Report":

"Once there was a man who thought the public would buy a delicious and nourishing ready-cooked breakfast cereal. Some people laughed at his idea, but he had confidence and determination. Through the years his ideas built great factories to manufacture cereals. In making and distributing these products, thousands of new jobs were created. . . . This is the spirit of all American industry under our system of free enterprise. With proper incentives and with the support of public opinion, American enterprise can repeat in the future what it has accomplished in the past."

It is significant that the ideals of President Truman seem not at variance with this concept.

Hors d'Oeuvres

• They say that the public is losing some of its interest in vitamins. Seems a lot of people have taken a lot of pills without noticing any change in their bad health or their good behavior.

• *It's getting so that when you order steak the waiter gives you the horse laugh.*

• The French and British seem disturbed because our German prisoners get the same diet as our soldiers. Every inch of territory gained means another meat eater at the table, they say. Maybe they have something there.

• *When our soldiers invade a place like Okinawa, they take along enough food for the native Nips.—So that's where all our rat-trap cheese is going!*

• Last year 900,000 tons of sugar was diverted to the production of invert molasses to be made into industrial alcohol urgently needed for the manufacture of synthetic rubber, explosives and other vital war materials. Verily, the war has blown the lid off the sugar bowl.

• *The off-season winter consumption of lemons has been nicely upped by promoting the fruit as a laxative: "Lemon and water first thing on arising." There's no constipation in the think-tanks of the citrus promotion boys. They're regular guys.*

• The Department of Agriculture says that the dehydrators will face some difficult adjustments in the postwar period. The British flair for understatement seems to be spreading.

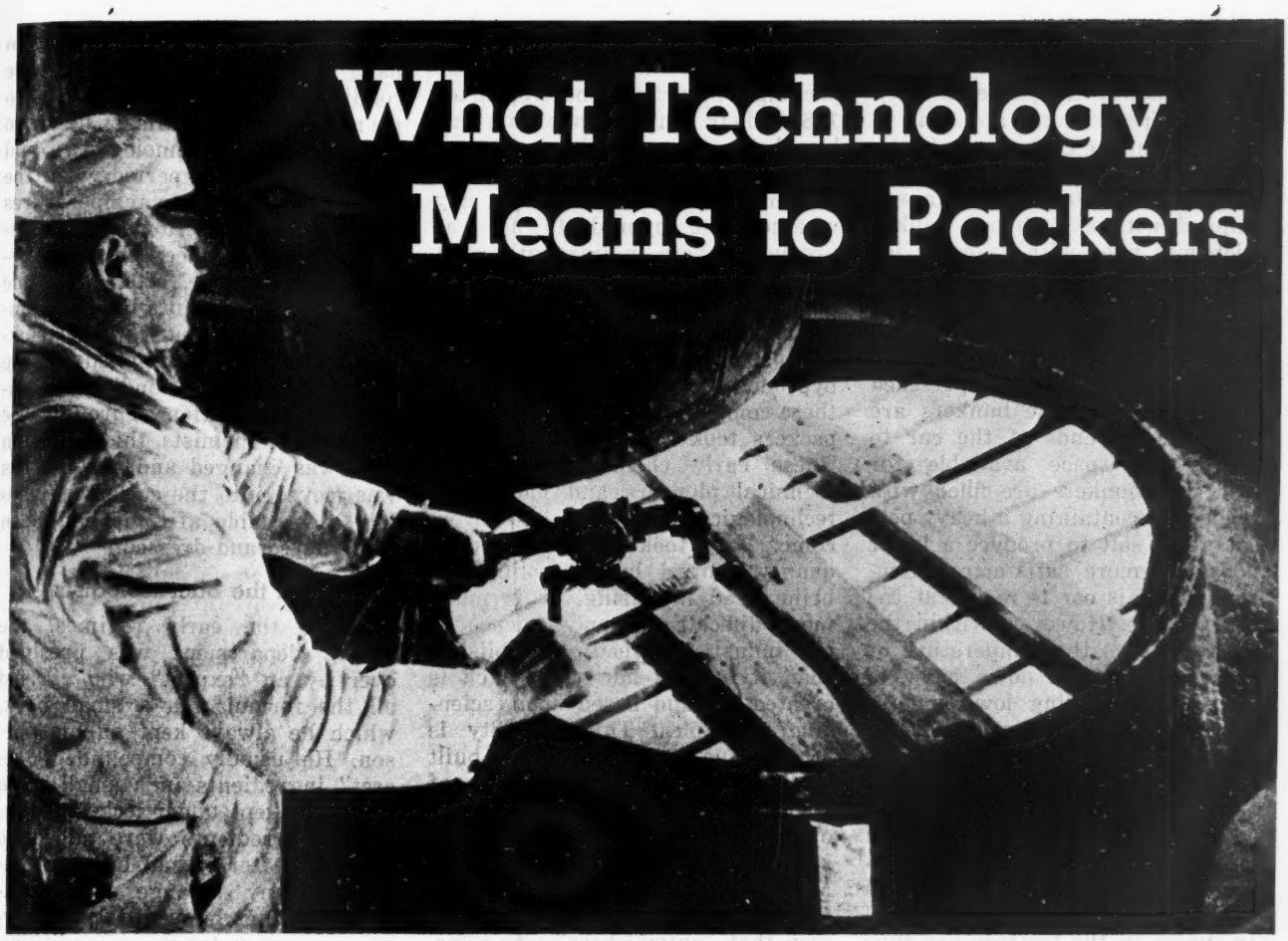
• *Cattle ordinarily will not eat salt grass, but 'tis reported that they like it when sprayed with a solution of one-third water and two-thirds molasses. If it will make beef more plentiful, feed 'em candy-coated grass, feed 'em chocolates, anything.*

• It is claimed that dairy products supply 77 percent of the calcium, 47 percent of the riboflavin, 39 percent of the phosphorus, 24 percent of the protein, 19 percent of the vitamin A and 18 percent of the fat in the human diet. Apparently we've never been weaned.

• *Somewhere among the postwar plans of the* 4,000 *wholesale ice cream manufacturers ought to be a high-quality, low-cost program which would freeze the freezers of the* 11,000 *retail ice cream makers.*

• In this column last month the Euphrates River was located in India.—The world do move. F. K. L.

What Technology Means to Packers



First technological step in quality control over processed meats was laboratory standardization of the brine used in curing. With brine standardization came centralized sanitary mixing in storage supply tanks and the filling of curing vats merely by opening a valve on a hose line. The previous difficulty with variation in curing conditions from tank to tank was thus eliminated.

If you want to keep up with your competition, you ought to read this "road map" to progress in one of the country's most important industries. It matters not what your business is, the packers' philosophy will serve you well — Part I*

By J. J. VOLLERTSEN, Research and Development Department, Armour & Co., Chicago, Ill.

PROBABLY the best way to illustrate what food technology means to the meat packer is to give some idea of what the meat packing industry was like prior to the advent of the technologist as well as outline his functions and accomplishments as of the present.

At about the time of the Civil War, the conversion of livestock into meat was carried on in small country slaughter houses so situated that the byproducts or offal easily could be disposed of by distribution to farmers or by dumping them into nearby streams. Shortly after 1870, some centrally located packing houses were established. In those days the slaughtering operations were not greatly different from those used in the country slaughter houses. But before long, various types of machinery were introduced and the methods employed were soon on an entirely different basis. Even the processing of meats by curing and smoking was begun.

The slaughtered livestock was sold in whole or half carcasses and the edible organs were likewise disposed of for human consumption. Blood was cooked, pressed and sometimes dried, the scrapings and inedible parts of animals were dried (without any particular care as to cleanliness) and the bones were either air-dried or put through steam-jacketed dryers. The sinews, hoofs and horns were either given away or thrown into dumps. Many of these products went into the fertilizer industry, although some of the bones were converted into glue or gelatine. There sprang up around these packing houses a group of satellite or byproduct companies which took these products from the packers and formulated them into finished materials of one type or another.

Progress in Refrigeration

One of the principal reasons for the rapid expansion and technological development of the modern packing house was the introduction of mechanical refrigeration and the refrigerator car. Engineers

*Based on paper read before the January, 1945, meeting of the Chicago Section, Institute of Food Technologists.

and mechanic has a great deal to do with the growth of meat packing, by enabling the packer to keep his meat fresh longer and ship it farther from the central plant.

In these original refrigerator cars the entire top of the car was equipped with a V-shaped bunker which was filled with cakes of ice at the time the car was loaded with meat. At 24-hour intervals during transit, the cars would be reiced enroute by local ice dealers. This type of car was later superseded by one in which the bunkers are located at the ends of the car to enlarge the space available for meat. The bunkers are filled with crushed ice containing a heavy percentage of salt to produce a lower and much more satisfactory temperature. This car is in use at the present time. However, within the last few years the temperature of the car is brought down prior to loading by spraying low-temperature brine on the walls of the bunker. This more rapid lowering of the car temperature puts it in condition much more quickly. Then the crushed ice is added and the tanks are brined by filling the interstices between the ice lumps with brine at 10 to 15 deg. F. All air spaces in the bunkers are thus permeated with an effective heat-transmitting medium which carries the heat from the tank walls to the ice. While these cars are sometimes reiced, reicing is not as necessary as with the old system.

Came the Chemists

The first chemists came into the packing industry shortly after 1880. Their work at that time was largely analytical, and soon a control system was set up whereby the packer knew from day to day whether the byproducts he was producing were in line with what was considered to be normal. In addition to this, the packers began to use the byproducts which they had been selling to the satellite or byproducts companies. One by one these companies disappeared as the packers took over their functions. These early chemists were real technical pioneers and had many technological problems to overcome. They took the first step in quality control by controling the brine used in curing. It is much more difficult to apply science to an industry already established than it is to a new one which is created by, and based upon, scientific principles. This difficulty is largely due to the traditions built up by the use of old methods of operation and the conservatism of operating personnel. To illustrate some of the fallacies which existed at that time, we call attention to the belief among the operating men that "animal heat" was something entirely different from any other type of heat. Their conviction was that if this "animal heat" was not removed before the carcass was placed in the cooler, dire results might obtain. For this reason the carcass was allowed to hang under ordinary temperature conditions for a sufficient period to permit this "animal heat to escape." As a technologist would expect, during the period when the meat was exposed to temperatures between 100 and 70 deg. F., bacterial flora had an excellent opportunity to increase, often with the result that sour joints became common. The term "sour" in the packing house is often applied by the operating men to a condition of incipient putrefaction. Through the work of the chemists, this situation soon was changed and the carcass was moved into the coolers as rapidly as possible after it had been slaughtered and dressed.

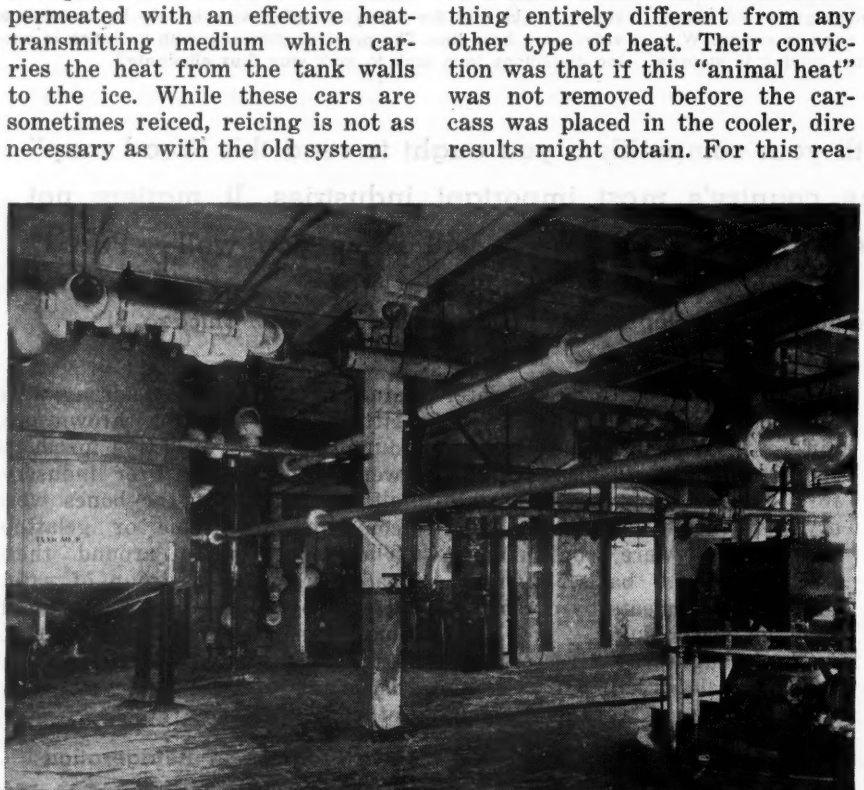
Then the Bacteriologists

Under the early regimes, the curing department was presided over by an "expert" who carried all the formulas in a small book, which he always kept on his person. He usually compounded "secret" ingredients in a small room which he kept under lock and key. These ingredients were added to the cure after it had been formulated. Many strange and unexplained things happened in the curing process under these conditions. Some of the meat would become "sour" while another vat alongside would be all right. This was a bacteriological problem which was solved after the entrance of the food technologist into the industry.

At this point it is well to emphasize that the work of the technologist in the food processing industry cannot be restricted to edible products alone but must include the handling of byproducts and wastes of all kinds. The proper handling of these commodities often has considerable bearing on the success of the industry itself. It is with this in mind that we will discuss the subject of chemical control.

As previously stated, the early chemist in the packing house, with perhaps one or two technical assistants, was occupied largely in applying analytical procedures to the control of various manufactured products. It may be interesting to show how the scope of this work has enlarged and to describe some of the functions of the large control laboratories that are now supported by the meat packing industry.

A laboratory is usually divided into divisions, each of which conducts analytical work on definite



Fat and oil processing quite often involves hardening by hydrogenation, which means technically controlled mixing, heating and deodorization even when operating on a batch basis.

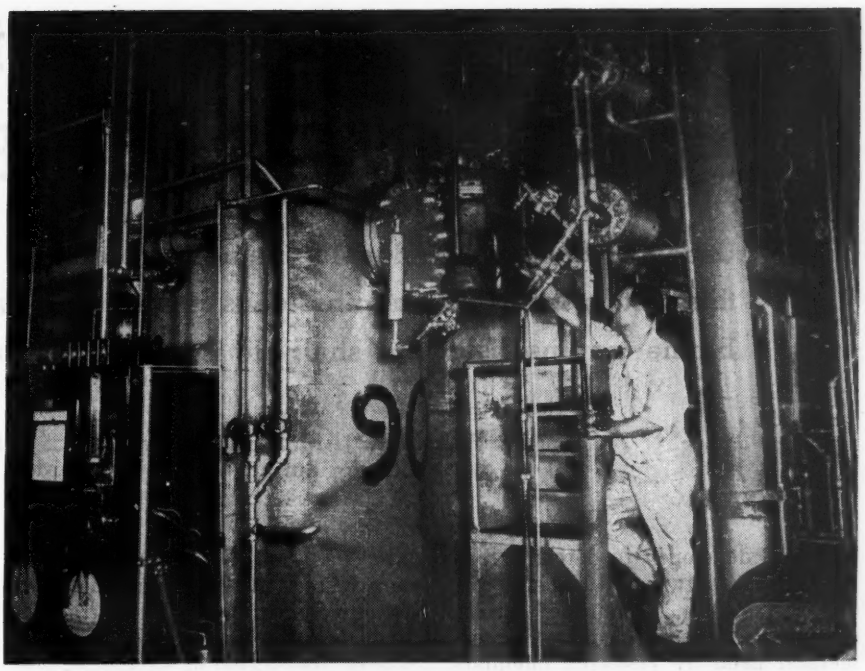
classes of products and acts as the controlling unit for the departments which manufacture them. One of these divisions takes care of all kinds of meat products, whether they are fresh or cured; most of their work is connected with cured products, such as hams, bacon, sausage and canned meats.

Conforming to Regulations

When the Pure Food Law was enacted in 1906, the Department of Agriculture established the Bureau of Animal Industry to have direct supervision over all Federally inspected packing houses. After considerable study, the BAI inaugurated regulations which must be followed by such establishments. The following examples will illustrate a few of these regulations. In the curing of meats, only specified ingredients may be used, such as salt, sugar, sodium nitrate and/or sodium nitrite. There is no limitation on the use of salt and sugar, but to make a product palatable the salt must be kept as low as possible. The regulations state that we are not permitted to have sodium nitrate in excess of 200 p.p.m. in any finished cured product. The function of the control laboratory is to see that our operations are such as to keep within this limit. The finished smoked ham likewise should not contain more moisture than the green ham from which it is made. This specification is regulated by the moisture-protein ratio, which is based on an average of a large number of analytical determinations. The amount of fat permitted in pork sausage is likewise regulated and must not exceed a stated percentage of the finished product. Many other instances of this type could be cited.

Fat and Oil Chemistry

The fat and oil department of the laboratory makes analytical determinations directly connected with the control of the various types of shortenings and inedible tallows, greases and animal oils produced. The percentage of fatty acids in lard and the stability of this product is important, and both are affected by the method of manufacture. Tallows are sold on the basis of their free-fatty-acid content, color and titer and the amount of moisture, insoluble impurities and unsaponifiable matter they may contain. These go largely to the soap factories where all of these factors are important in the manufacture of high-grade soaps. Animal oils are produced by separating the saturated glycerides from the unsaturated by crystallization and pressing operations. All of these oils are likewise sold on definite specifications of color, cloud test, unsaponifiable matter and similar properties. Oleo oils are used for edible purposes, largely in the margarine industry, and the various grades are separated according to their free-fatty-acids, color and melting point.



Present day large-scale meat packers also are engaged in fat and oil refining which requires engineering and technological control of the highest order, particularly when deodorization is carried out on a continuous basis under instrument control.

Byproducts Improved

All animal feeds in the packing plant are made from the byproducts of the slaughtering department and consist of tankages, meat meals and meat and bone combinations. There are different standards for the percentages of protein and tricalcium phosphate which these feeds must contain and these again are controlled by the packing house chemist. Originally, practically all of these materials were sold for fertilizer purposes, but through the work of the chemist, in cooperation with the operating man, they were thoroughly cleaned up and improved. At present, very little organic material from the packing house is relegated to the fertilizer industry.

Cleaner Than a Kitchen

The bacteriologist is the main cog in the control of sanitation throughout the packing plant. Meat is an extremely perishable product and great care must be taken to keep down the bacterial load. The general public has no conception of the tremendous volumes of water used by the ordinary packer. If figures of water used were presented, one could get the idea that the meat products were being floated to market. This tremendous volume of water is used in the sprays and showers necessary to produce clean meat and in the innumerable cleaning operations of plant and equipment. A modern packer does not trust to luck for a sanitary water supply. Rigid bacteriological control and supervision of water treatment, utilizing the most modern chlorinators and duplicating in every way the safeguards of a good municipal supply, have resulted from an enlightened attitude on the part of the packer. The laboratory supervises the clean-up jobs. And the cleaning of tools and equipment used in the packing plant is far superior to the cleansing practiced in the average home. Specially trained men visit every operating department regularly, take swabs of the equipment and hands of the employees, make critical examinations of the finished products and take measures in every way possible to insure the highest degree of cleanliness.

In our company, the soap and glue factories have separate lab-

(*Turn to page* 172)

Chemical Shelf-Life Test IMPROVES CEREALS

Used as a check when developing new products or changing processes, this test is insurance against consumer complaints about rancidity. Blame for unsatisfactory shelf life is placed squarely where it belongs

By FRANK E. JAMES, Manager, Cereal Laboratory
Ralston Purina Co., St. Louis, Mo.

FIRST developed to detect errors in manufacture and the effect of changes in the formula of shredded whole wheat products, a test method used by research chemists of Ralston Purina Co. has been applied to many different products—crackers, oil meals, self-rising and fortified flours, Army biscuits, corn, wheat and bran flakes. Coarse materials are easier to handle than fine products like flour.

Grocers and consumers long have been distressed by the staleness and rancidity of cereals which deteriorate unduly soon in the warehouse or on store shelves. Anything that will aid in extending the shelf life of these products by even a month or two is of great value. Hence this report. The "rancimeter" does a quick, accurate detective job on the potential salable life of cereals.

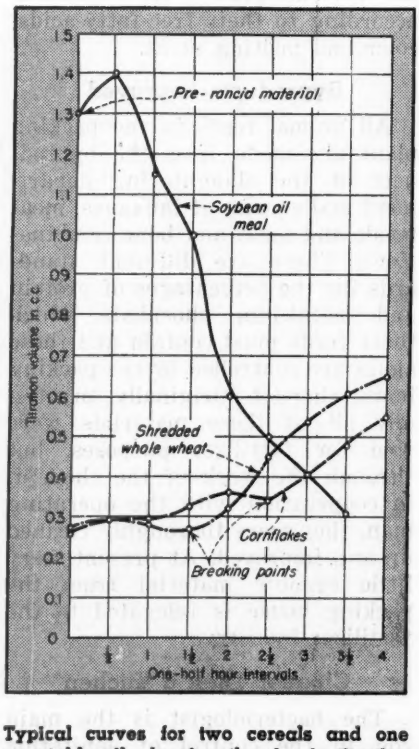
Consumers Complained

When we started this test we had a problem of rancidity. We had customer complaints, and it was found that one of our cereals was going rancid in two or three weeks. On a small test apparatus which we constructed, we found that the new cereal direct from the plant would show rancidity in half an hour. After much experimentation, it was determined that the flavoring material was too strong and was causing our trouble. When we had corrected that point, the cereal would last from two to three hours before it went rancid under test. Then, in order to get a true correlation between shelf life and the results on the test machine, we began to collect samples direct from the store shelves.

In each city our representative bought 48 packages of cereal and sent them to the laboratory. The date was noted and the samples were tested. It was found that age, storage conditions and manufacturing processes all contributed to the rate of production of rancidity. Under average conditions, the particular shredded product which we were testing would last seven to eight months.

The most valuable use for the new equipment is to predict the life of newly manufactured products. If they hold up well on the machine they will last a reasonable length of time under average storage. Whenever we change production methods we test the product to see if the keeping time has changed.

In 1931 Gretlie and Newton developed a method to determine the induction period for the formation of volatile oxidative products in lard. We have modified their technic.

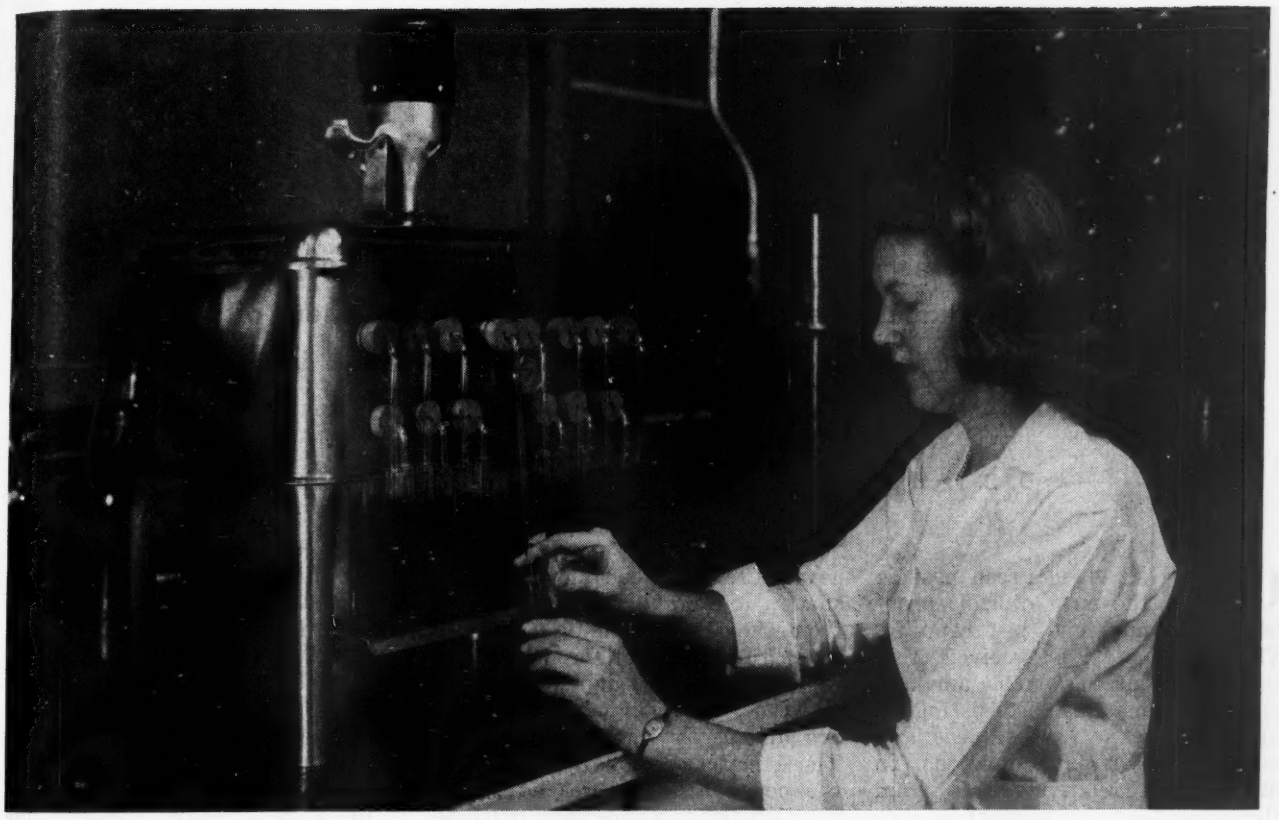


Typical curves for two cereals and one vegetable oil, showing the rise in titration value at the end of the induction period.

Like Gretlie and Newton, we have assumed that all of the volatile decomposition products contribute to the odor given off by a cereal which has a strong, rancid smell. We have found that the length of the induction period for the volatile decomposition product under a given set of conditions is proportional to the shelf life of the cereal. To measure these compounds, a stream of air which has previously been washed by passing through acid permanganate is forced through a prepared sample of the ready-to-eat cereal, or whatever is to be tested. After passing through the hot cereal, the temperature of which has been determined by experiment, the air is bubbled through standardized acid permanganate. At a given time interval the tubes containing the acid permanganate and the absorbed volatile gases are removed from the machine and titrated against standardized oxalic acid of equal strength. We like the permanganate-oxalic acid titration because it is the easiest to handle of all the methods.

Equipment Is Simple

The machine consists of a stainless steel water bath 18 in. long, 12 in. wide and 12 in. deep, fitted with 15 tubes. In 14 of the tubes are placed Pyrex glass tubes which contain the samples. The fifteenth tube holds a thermometer. Each end of the glass tube is fitted with a clean rubber stopper. The back end of the sample tube is attached to a manifold which distributes the air uniformly to all of the samples.



The "rancimeter" is simple to operate. A technician here is changing tubes of permanganate solution. Samples are placed within the horizontal tubes in the water bath.

Capillary tubing is placed in the stopper at the manifold to control the volume of air delivered to the sample. A delivery tube carries the gas from the sample through 10 c.c. of the standardized permanganate in a test tube on a rack carried on the front of the machine. Before passing through the sample, the air is purified by circulating it through three 3-liter bottles of acid permanganate, then through distilled water and finally through concentrated sulphuric acid to take out any moisture.

Procedure

The sample tube is removed and washed thoroughly with soap and water, then rinsed with distilled water and allowed to dry. Any trace of soap or foreign material will alter the test. The samples to be tested are crushed with a mortar and pestle. If the material is crushed too fine it will not allow the air to pass freely. Shredded products and flakes should pass a No. 12 mesh Tyler screen.

A sample large enough to fill it two-thirds full (30 gm. for flaked cereals and shredded products) is put into an open-ended tube, cotton plugs are inserted and the tubes are placed in the machine, which is held at 97 deg. C. for flakes and shreds. Connections are made on the back and front ends of the sample tube and the machine is ready.

Compressed air is turned on until 120 bubbles per minute pass through the collection tubes. If the capillaries at the manifold do not control the flow of air properly, pinch clamps are installed on the rubber tubes between the capillary and the sample tube. At regular intervals, which should be one-half hour for cereals that break down in from three to four hours, the 10 ml. of standard permanganate is removed from the machine and a fresh aliquot is put in its place. The acid permanganate containing the absorbed volatile gases from the cereal is poured into an equal amount of oxalic acid of the same strength. After the solution becomes clear, the material is heated to the boiling point and titrated with the standardized permanganate. A record is kept of the titration for every half-hour period until the amount of permanganate used in the back titration increases materially, as is shown by the typical curves.

If the samples are removed from the machine when the high titration value is reached, a rancid odor can be detected. If experiment shows that it takes ten hours to break down a certain sample, then the machine can be run for six or eight hours before the first titration is made, the titrations being repeated at regular intervals from then on until the sample breaks down. To reduce the induction period, the temperature of the bath can be increased, provided it does not toast the sample.

Use as Control Test

For each product, the induction period must be correlated with samples of known age which have been secured from store shelves. As the age of the cereal increases, the induction period becomes shorter. If something has happened in the production process to oxidize some of the fat, the induction period will be very short. Storage time will also vary in different parts of the country, depending on shipping and weather conditions.

After typical schedules have been prepared showing the correlation of the rancimeter induction period to the average safe storage period, tests are run each day on the plant production and the results are reported to the operating department. If the induction period is normal for the product, we know the plant is running satisfactorily and the cereals will keep.

Cleaning Vined Canning Peas By Froth Flotation

Removes troublesome foreign materials, saving labor on inspection line. Air bubbles can be attached selectively to materials to float them off. Complete details are given here. Principles might be applied in other fields

A. M. NEUBERT and M. K. VELDHUIS
U. S. Fruit and Vegetable Products Laboratory, Pullman, Wash.[1]

CLEANING vined green peas is one of the most difficult problems in commercial pea canning. The shelled peas, as received from the viner, contain variable amounts of foreign materials consisting of broken pieces of vines, peas and pods, as well as parts of weeds. To obtain peas relatively free from these substances, a number of special processes are used by canners, including size separation, air cleaning and washing and flotation with water, followed by hand sorting of the peas on an inspection belt. It is usually necessary to repeat size separation at intervals in the preparation line to remove loose pea skins and broken cotyledons. As a result of these operations, peas relatively free from foreign material are obtained.

Serious drawbacks to cleaning processes now in use exist, however. Certain weeds frequently found in pea fields yield flower or seed parts that are not removed effectively from the green vined peas by the mechanical processes now in use. Berries from the nightshade (*Solanum nigrum*), buds from the Canada thistle (*Cirsium arvense*), flowers of the dog fennel (*Anthemis cotula*) and seeds of the tarweed (*Amsinckia intermedia*) are among the most troublesome. These materials follow along with the peas until they reach the inspection belts, where they must be removed by hand. Because the amount of foreign material that can be removed by hand in the ordinary inspection is limited, it is frequently necessary either to slow up the sorting line or to discard the contaminated peas entirely. Nightshade berries are particularly troublesome because their resemblance to peas makes complete removal by hand difficult, even when they are present in small amounts. Losses due to nightshade berries in peas grown in the Blue Mountain areas of Oregon and Washington were estimated at 3 to 10 percent of the 1941 crop. Another serious drawback in cleaning operations results from the fact that broken peas, skins, and frequently foreign materials, accumulate with the smaller, more valuable peas as a result of action of the size graders. Thus the time required in hand-sorting the smaller sieve sizes of peas is much greater than that required for the No. 4 sieve size and larger.

In a preliminary report,[2] the authors described briefly a froth-flotation process that has been used experimentally to remove nightshade berries, tarweed seeds, dog fennel blossoms, loose skins and cracked peas from vined green peas. Additional data have been obtained during the 1944 season, with pilot-plant as well as commercial-size equipment, and the present report is based on results of these more recent studies.

The process is recommended as a supplement to present cleaning operations and is not intended to replace them. It probably will be most useful when placed in the No. 1, No. 2 and possibly the No. 3 sieve lines, following size grading and before blanching. When used on these sizes, the quality of the canned peas is improved by the removal of splits and skins, as well as certain foreign materials.

It should be noted that results obtained in 1944 in an area where thistle bud is a problem showed that the process was not effective in removing thistle buds from vined green peas.

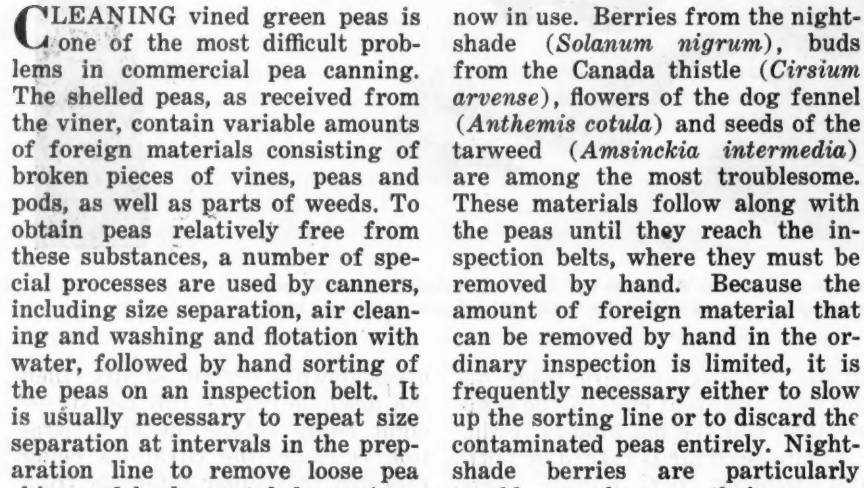


FIG. 1. Treater section of froth-flotation pea cleaner. Capacity of the commercial unit shown here is about 1 ton of peas per hour.

[1]Conducted under a cooperative agreement between the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture, and the Washington Agricultural Experiment Station. Published as Scientific Paper No. 636, College of Agriculture and Agriculture Station, State College of Washington, Pullman, Wash.

[2]M. K. Veldhuis and A. M. Neubert, *Western Canner & Packer*, vol. 36, No. 6, 18, 47, May, 1944.

With proper application of the froth-flotation process, it is possible to attach air bubbles selectively to certain foreign materials. These attached bubbles change the effective density of the foreign material, so that it can be floated in a solution of such density that the peas sink. To a certain extent, mechanical entrapment of air in the foreign material aids the separation, and is probably mainly responsible for the separation of pea skins and splits.

The process involves the use of an oil-in-water emulsion into which air is incorporated as small bubbles. A foaming agent is used to maintain the stability of the foam and to aid in the emulsifying of the oil. The density of the mixture in the separation unit varies with the amount of separation of foam. At no point does it appreciably exceed that of water, and in certain parts of the mixture it is well below 0.7.

Separation Equipment

The separation process as developed for commercial use is divided into two steps. The first step consists of wetting the peas with the emulsion, followed by draining. For convenience, the equipment designed for this step is referred to as the "treater" (Fig. 1). The second step involves spreading the "treated" peas over a foam bath and recovering the floating and sinking fractions therefrom. The equipment for this step is referred to as the "separator" and the area which the foam is applied as the "foam area" (Fig. 2).

It is not the purpose here to give a shop blueprint of equipment required for the process. Each canner probably will have special problems in applying the process to his needs and can arrange the details to his own convenience. Only the essential features of the equipment, including the important dimensions, are shown in flow-sheet form. The design for the commercial unit is essentially the same as that supplied commercial canners in the Blue Mountain areas for trial use in the 1944 season. This equipment was found capable of cleaning 2,000 lb. of peas per hour. Suggestions for alternate equipment are made below, as well as for improvements in design suggested by trials made with this equipment and with pilot-plant equipment.

The purpose of the treater is to wet the entering material with the emulsion and thus prepare the surfaces for selective bubble attachment in the separator. The material acquires a thin layer of oil on its surfaces during treatment. Another function is to reduce the amount of dilution and contamination of the separator fluid with pea juice. No air is used in this step. Separating efficiency is considerably increased.

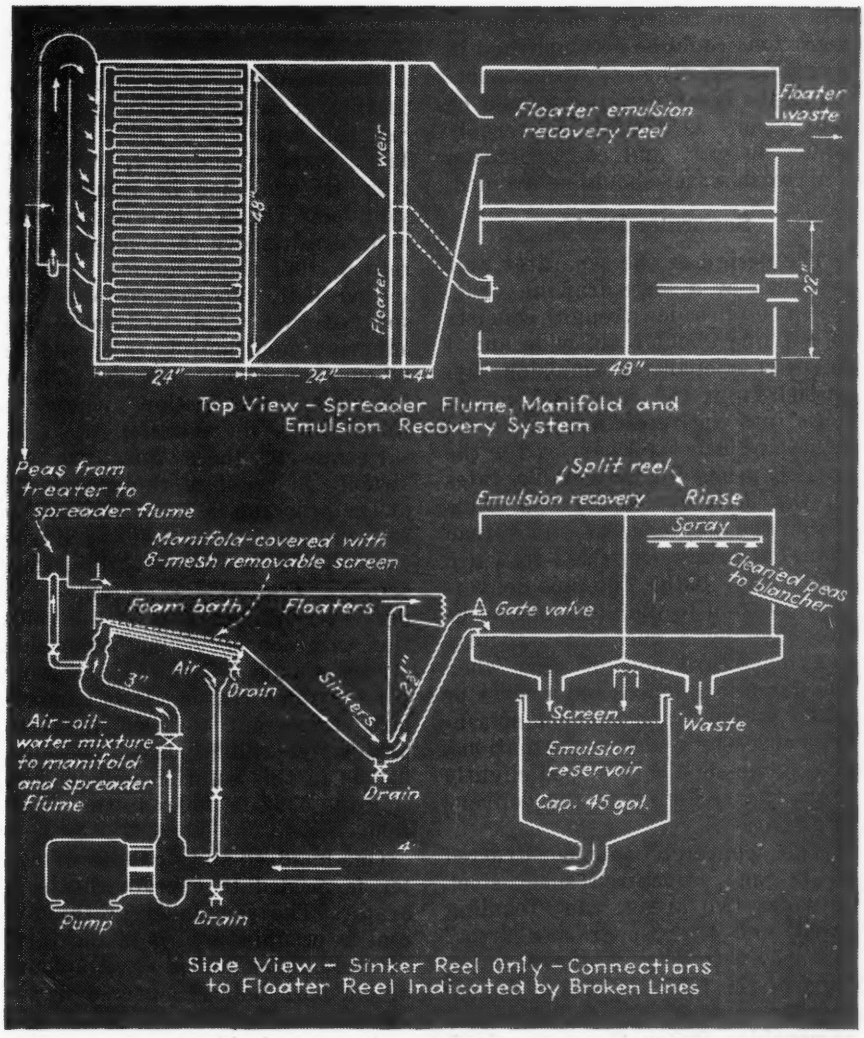


FIG. 2. Separator section of froth-flotation pea cleaner. Capacity is about 1 ton of peas per hour. The spreader flume design is of particular interest.

Figure 1 shows equipment for the treating operation in a scale drawing. The peas are rinsed and drained as they pass through the first reel, whereupon they drop into the hopper and are carried along the 4-in. pipe by the emulsion and deposited in the second reel. The drained, treated peas then pass on to the separator. A funnel recovers the emulsion from the second reel and returns it to the small reservoir, where a pump circulates it back to the hopper. A half-inch standpipe fitted with valve and funnel is connected to the pump inlet pipe for use in preparing the emulsion, as will be described later.

Experience has shown that the two reels, 24x36 in. in size, should rotate slowly to attain as complete drainage of the peas as possible. Spirals inside the reels are desirable, in order to regulate the flow of peas. The first reel may be lined with a sufficiently coarse screen to permit the removal of small debris. The second reel should be lined with a fine screen (48-mesh is suitable), and a similar, removable screen is required over the reservoir. These fine screens are necessary to remove debris which, if permitted to circulate in the solution, would soon be disintegrated by the action of the pump, thus unnecessarily contaminating the emulsion. A 1-in. inlet centrifugal pump was found suitable for circulating the emulsion in the treater. Valves and drains necessary for draining and cleaning are shown. Where it is necessary to elevate the peas to the separation unit, it should be possible to use a hydraulic or washer elevator, with emulsion replacing water as a circulating medium. In

this way the treating and elevating operations could be accomplished in a single step. The operating capacity of the treater system should be kept as low as possible, preferably under 30 gal., and contamination with wash water should be avoided.

Separator Design

The design of the separator unit is shown by a scale drawing (Fig. 2). The spreader trough[3] consists of a flume about 5 in. wide and 4 in. deep. Separator emulsion, bypassed from the separator pump, flows into the receiving end of the flume and acts as a carrier for the treated peas. Six adjustable gates on the delivery end of the flume divide the treated peas and spread them uniformly over the 4-ft. width of the foam bath. The pipe delivering emulsion to the flume should be protected by a fine screen to prevent backward flow of peas when the pump is stopped, and a cover or baffle is needed to prevent splashing caused by pressure fluctuations. The flume should be sloped slightly from the receiving to the delivery end.

The separator tank, constructed of 18-gage galvanized sheet steel, provides two areas: the "foaming area" and the "separating area." As shown in Fig. 2, the foaming area of the tank, 4x2 ft. in dimension of surface, is supplied with a removable 8x8-mesh, galvanized, hardware-cloth, false bottom. The manifold, having about 224 holes of 5/32-in. diameter, facing down, and placed under the false bottom, supplies the air-oil-water mixture to the foaming area. The ends of all manifold pipes are closed. The manifold is connected to the delivery pipes through the bottom of the tank by means of unions, to permit easy removal for cleaning. The false bottom has a 5½-in. drop over its 2-ft. length, to aid in moving the peas to the separating area. It was found that the depth of emulsion during operation, which is regulated by the height of the floating discharge weir and the sinker outlet valve, should be 2 in. at the foam-bath entry and 1½ in. deep over the weir.

The separating area consists of a collecting funnel having a 45-deg. sloped bottom with a 3-in. gravity outlet pipe for removal of cleaned peas that sink, and a weir and collecting trough for removal of the floater fraction consisting of nightshade berries and other foreign material.

The emulsion is removed from the floater fraction by a 20x48-in. reel and returned to the reservoir. The sinker fraction is removed from the emulsion by means of a split reel. The first half of this reel is used to remove the emulsion and return it to the reservoir. In the second half, the cleaned peas are sprayed with water to remove the adhering emulsion. Care should be taken that spray does not splash into the first section, where it would dilute the solution.

Spirals in these reels are desirable, to regulate the movement of the peas and debris. The floater reel and the first half of the sinker reel should be lined with a fine screen (48-mesh is suitable), to prevent contamination of the solution with debris. A fine, removable screen should cover the reservoir for the same reason. It is particularly important to keep the separator solution clean, because debris in this solution will tend to clog the 5/32-in. holes in the manifold.

One-hundred-sixty gallons of water is needed to operate this separator. The remainder of the volume is occupied by air in the form of fine bubbles and a small amount of oil, both being dispersed in the solution.

An undesirable feature of this separator is the fact that it permits accumulation of peas on the false bottom of the foam bath. Although efficient separation was attained, it was necessary to sweep the peas from this area to the separating funnel at the end of each lot in order to prevent mixing with succeeding lots. To overcome this difficulty, a pilot-plant separator was constructed that differed from the above-described machine in that it was only 2 ft. wide and had a 45-deg. slope in the foam-bath area as well as in the funnel. This machine was found to clean peas efficiently and was self-cleaning. Certain difficulties attend adaptation of this design to a separator 4 ft. wide, however. With a separator 4 ft. wide, having a 45-deg. slope along a 2-ft. foam bath and a 45-deg. slope in the collecting funnel, the sinker outlet would be about 40 in. lower than the floater weir.

From the results of these studies, it would appear advisable to construct the 4-ft. separator with a foam bath having a 30-deg. slope and increase the foam bath length to 2½ ft. A power-driven, horizontal, collecting spiral, located just below the discharge end of the foam bath and designed to move the peas to the center of the separator, could be used to collect the peas and deliver them to a gravity-flow outlet. Such an arrangement would reduce the height of the floater discharge weir to about 26 in. above the sinker outlet and the length from the feeding end of the foam bath to the floater discharge weir to about 30 in. It would appear that a 30-deg. slope in the foam bath would be sufficient to cause rapid self-cleaning. Increasing the length of the foam bath to 2½ ft. would allow slightly more time for bubbles to attach themselves to the floater fraction, thus compensating for the more rapid passage of the peas over the foam bath.

Separator Pump

The type of pump used in circulating the separator solution and in introducing the air determines the operating characteristics of the equipment. Experiments indicated that any type of centrifugal pump having sufficient capacity will operate successfully. Pumps operating at 1800 r.p.m. appear better suited, however, than pumps operating at higher speeds. Either open, semi-open, or closed impellers were found satisfactory. As indicated in Fig. 2, the pump receives the emulsion by gravity from the separator reservoir through a 4-in. pipe. A 1-in. standpipe is attached immediately before the suction side of the pump. This standpipe should be higher than the top of the reservoir and should be equipped with valve and funnel. The valve remains open during operation to admit air into the system. A 3-in. outlet pipe, supplied with a valve, carries the air-oil-water mixture to the manifold. This supply pipe should be reduced to two 2-in. pipes feeding the manifold at two points.

The pump should have sufficient capacity to maintain a half-inch level over the floater discharge weir and provide a suitable stream for removal of the sinker fraction. A pump delivering 275 to 300 gal. of water a minute against a 5-lb. head, with a gravity inlet and without air, has a suitable capacity. When operating in the manner of this system, the total volume handled by a pump of this size is about 190 gal. a minute, of which about 60 gal. is air.

The unit should be regulated so

[3]Designed in cooperation with Mr. Joseph B. Schaller, Mechanical Superintendent, Walla Walla Canning Co.

that there is a back-pressure of about 5 lb. per square inch against the pump when operating with emulsion and with the air intake open. This pressure is controlled by the number of holes drilled in the manifold. A pressure gage at the manifold is useful.

Auxiliary Reservoir

To operate the froth-flotation separator for extended runs, it is necessary to have an auxiliary reservoir in which the emulsion can be prepared and pumped to the treater and separator units as needed. A 1-in. inlet centrifugal pump may be used to prepare and maintain this emulsion and to pump it where needed. A half-inch standpipe, with valve and funnel, should be connected to the intake line for use in preparing the emulsion. It is convenient to have the capacity of the auxiliary reservoir somewhat greater than the operating capacity of the separator, so that it can be used to measure the water necessary to operate the separator. A 2- or 3-in. pipe supplied with a valve and connected to the separator pump will reduce the time required to fill the separator at the beginning of a run. A reservoir capacity of 175 gal. is sufficient to fill the separator shown in Fig. 2 to operating level.

The arrangement of the treater, separator and auxiliary reservoir may be made to suit the convenience of the canner. Figures 3 and 4 are photographs of a commercial unit constructed by a canning company for use in the 1944 season. In this unit, a gooseneck conveyor was used to elevate the washed peas to the treater hopper. The treater was mounted above the separator and the flow was opposite in direction to that of the separator, in order to conserve space. The auxiliary reservoir and pump were mounted under the foam bath of the separator.

Reagents and Emulsion

A number of reagents may be used in preparing the solutions used in the froth-flotation process. For simplification, however, only the reagents found most satisfactory will be mentioned. A purified mineral oil having an initial boiling point (ASTM) of about 400 deg. F. and a final boiling point of about 500 deg. F. has been found satisfactory. The oil should have an unsulphonated residue of 98 to 99 percent and a Saybolt viscosity at 100 deg. F. of 30 to 35. The oil should be specially refined to reduce odors but should be free from added odor neutralizers. Oils meeting these specifications are sold by most oil companies as bases for fly spray and other preparations. The more completely deodorized oils are preferable.

A technical preparation of sodium lauryl sulphate was the most satisfactory of the detergents studied. It may be obtained in either powder or paste form. The principal reagent in point of quantity is water. There appears to be no special qualifications for the water used, further than those required of water used in a food plant. Hardness did not appear to interfere with the wetting and emulsifying action of sodium lauryl sulphate.

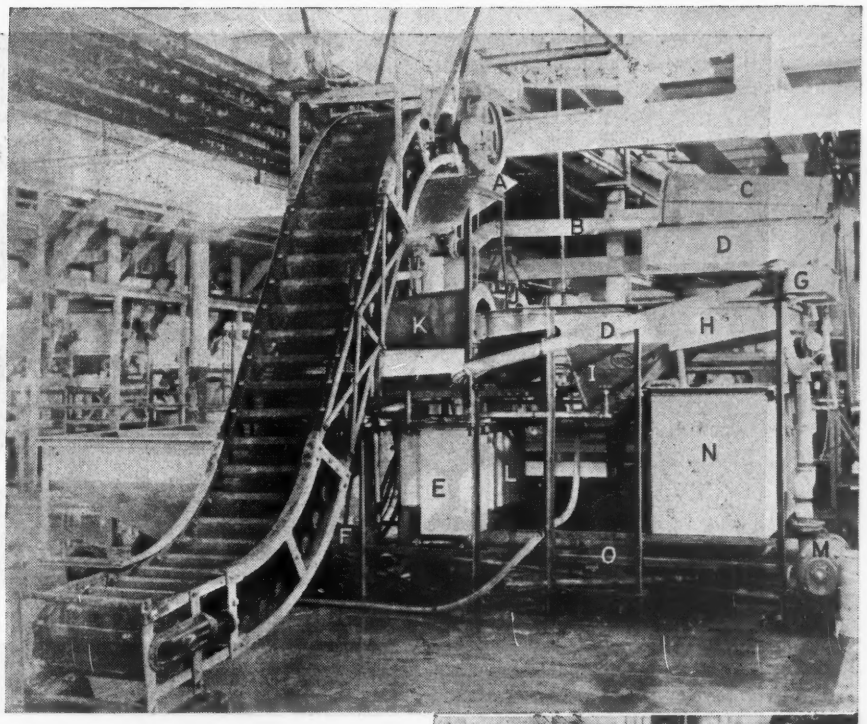


FIG. 3. Separation unit in a cannery. Elevator conveys washed, drained peas to treater hopper.

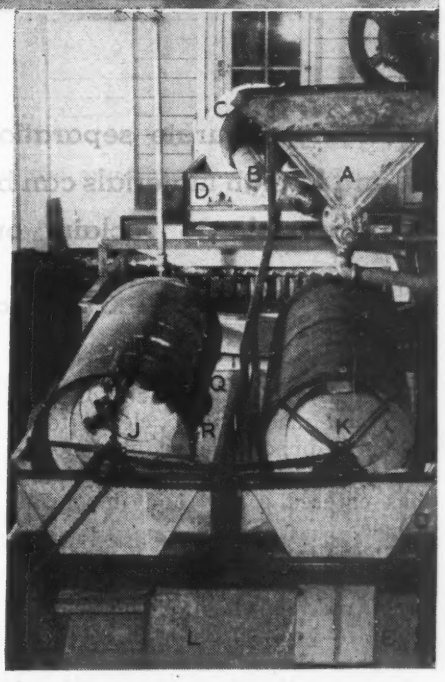


FIG. 4. Commercial unit shown from above. Screen (8x8 mesh) covering manifold has been removed.

Key to letters used in Figs. 3 and 4.

- A. Treater hopper
- B. Treating pipe
- C. Treater-emulsion recovery reel
- D. Treater-emulsion recovery funnel and pipe for returning emulsion to treater reservoir E
- E. Treater-emulsion reservoir
- F. Treater-emulsion circulating pump
- G. Spreader flume
- H. Foam bath
- I. Sinker collecting funnel
- J. Sinker-emulsion recovery and sinker washing reel
- K. Floater-emulsion recovery reel
- L. Separator-emulsion reservoir
- M. Separator-emulsion circulating pump
- N. Auxiliary-emulsion reservoir
- O. Floater-emulsion recovery funnel
- Q. Sinker-emulsion recovery funnel
- R. Rinse-water collecting funnel.
- S. Manifold

Preparation of Emulsion

The liquid used in the froth-flotation process is an oil-in-water emulsion. The most suitable method found for preparing the emulsion is as follows: Water is placed in the system and the circulation pump is started, detergent is added, and the oil is then introduced slowly through the standpipe. This procedure mixes the oil with the water in front of the pump, and the pump accomplishes emulsifica-

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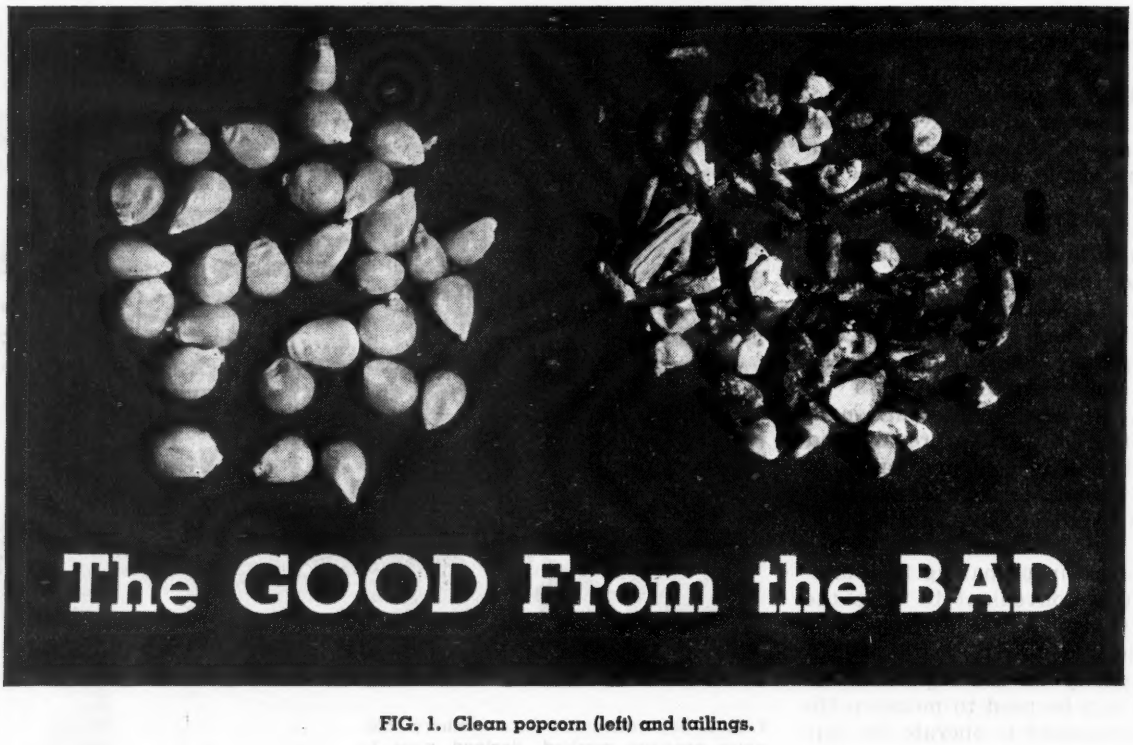


FIG. 1. Clean popcorn (left) and tailings.

Highly accurate separations of good grains, cereals and nuts from bad particles and foreign materials can be made with specially developed equipment. This makes it possible to reclaim or recondition lots that otherwise must be discarded

By D. L. KLEIN, Vice-President, Products Separating Corp., New York, N. Y.

WITH the development of special machines to clean items hitherto impossible or uneconomical to handle, food reconditioning has entered a new and important phase.

Specialized air table separators, widely used in other fields, have been redesigned to effect separations of grains, nuts and seeds by weight, shape, size and surface characteristics formerly considered impossible. The operation of these units is based on differences in the physical properties of sound commodity and undesirable portion.

The machine consists of a fan which delivers air via a baffling system through a porous deck. This deck is mounted on springs and is driven as a conveyor. It can be tipped so that the conveying is uphill and tilted so it is aslant sideways. These last two adjustments produce an angle of flow by gravity away from the direction of conveyance. The feed is directed to the deck at one corner. As the air rises through the bed, the material stratifies according to its weight, the light portion rising to the top. (See Figs. 2 and 3.) This light material is not subjected to the conveyance of the deck and flows back down the gravity line away from the direction of con-

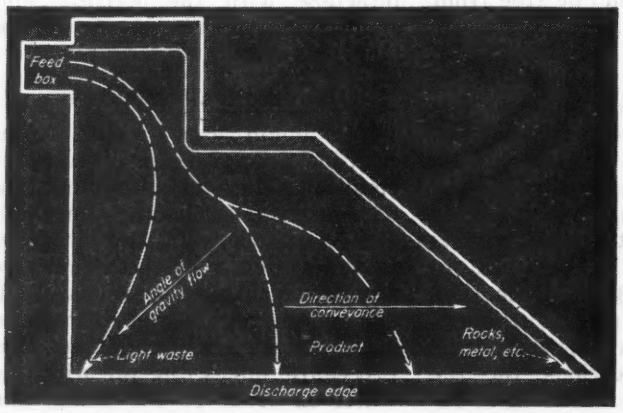


FIG. 2. Top view of separating unit showing flow of material relative to angle of gravity flow and direction of conveyor.

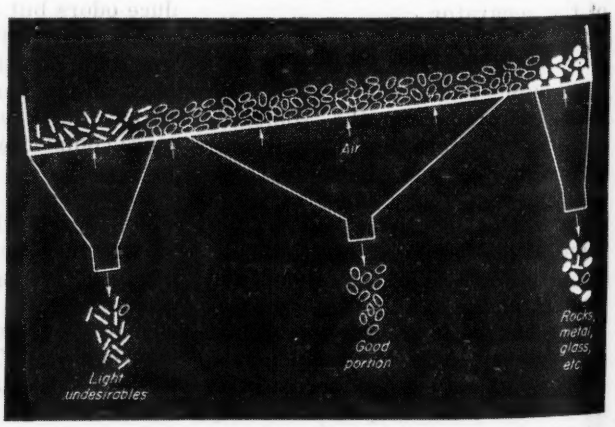


FIG. 3. Side view of separating unit showing materials separation, angle of incoming air and tilt of conveyor.

veyance of the heavier bottom layers which are in contact with the moving deck.

Because of the peculiar construction and operation of the equipment, together with the application of physical phenomena, these processes are highly specialized and require carefully trained personnel.

A partial list of commodities which have been separated and upgraded by this method is given in the table.

A great deal of the development work resulting in the above-mentioned separations has been conducted by Products Separating Corp. (New York City plant) and its affiliates.

If the merchandise shipped in interstate commerce is found to be below the standard for mold, rancidity, worm or weevil damage, or contains an excess of foreign substance such as sand, stones, sticks, shells, or other contamination, it is officially detained by the Food and Drug Administration as unfit for human consumption. The New York City Department of Health checks foodstuffs in all metropolitan warehouses and processing plants. Many states and other cities too have such inspection departments. Reclamation is the first thing considered if a condemned material and its contaminant are separable.

To illustrate the application of this method of separation a few typical examples of actual work performed follow.

A company which deals in popping corn had received in a single shipment a very large amount of corn from a different state. The Food and Drug Administration inspected this lot and found it to contain an excessive amount of rodent excreta and the Federal marshal placed the merchandise under seizure by order of court after the filing of a libel. Two attempts were made to remove the excreta, and so lift the seizure. Both times the sample collected by the Food and Drug Administration was rejected as still below the government specifications. The corn was then shipped to the company in New York. In two days, the lot was cleaned and an inspection was made. After a thorough test, the corn was pronounced sound, and the excreta tailings were destroyed under Federal supervision. Further, the loss by cleaning was surprisingly small and the popping quality of the corn was raised appreciably by the removal of the imperfect and shriveled kernels. The separation is shown in Fig. 1.

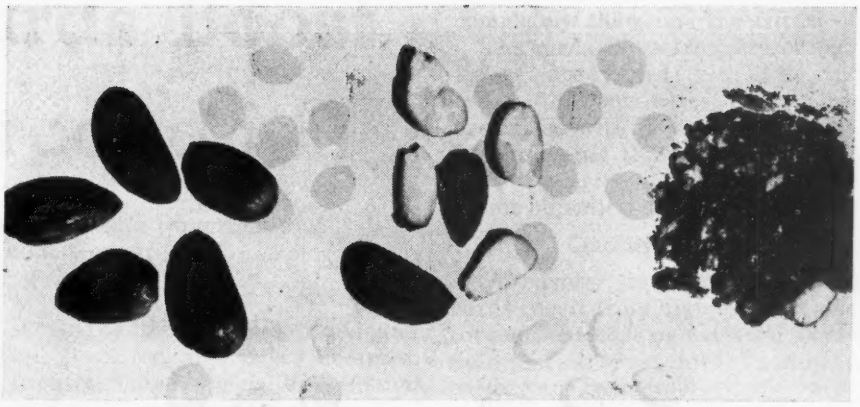


FIG. 4. Good whole almonds (left), bad whole and broken nuts (center) and pieces and undesirable screenings (right).

FIG. 5. Good tropical grass seed (left)—germination raised from 50 to 90 percent; rock and hull tailings (right).

Another case was that of an importer, who, due to the war, was cut off from his usual source of supply. He therefore brought into this country a considerable quantity of Jordan almonds from a new source. After much delay in overseas shipment, the lot arrived in Philadelphia and was sampled by the Philadelphia office of the Food and Drug Administration. It was detained when tests showed excessive weevil and worm damage. The delay in transit during the warm weather had caused the life cycle of the offending insect to be speeded up, causing great damage to the goods. Following a thorough fumigation in a vacuum chamber, capable of commercial vacuums up to 28 in. (Hg) and using gas with no harmful effects on the almonds themselves, the shipment was transferred to the processing division. The dead insects, their webbing and dust, and the damaged nuts were removed (Fig. 4). Upon examination, the New York office of the Food and Drug Administration, acting for the Philadelphia station, raised the detention. The release became official after the rejected portion was destroyed under the supervision of the United States Collector of Customs, and the importer was informed that his merchandise was ready for pickup.

In another case, an importation of tropical grass seed, used for quick-growing military camouflage, was seized by the Grain Products Division of the Department of Agriculture as being below germination standards and containing too high an amount of foreign matter. By gravity methods the germination with the problem, the germination was raised and the foreign matter removed (Fig. 5). After an official test, the lot was released. This seed, incidentally, was warranted by the foreign shipper to have been thoroughly cleaned by his "modern, standard equipment." This particular separation indicates how the method may be applied to small particles, such as spices.

Bark, grit and sand are being removed from all types of nuts for many firms (Figs. 6 and 7).

Peanuts, for instance, can be cleaned of shells, stones and moldy and rancid nuts where hand-picking would be prohibitive since its cost is higher than the value of the nuts (Fig. 8).

Such separations as have been mentioned and listed, plus many more, are being made every day to aid the food and allied industries.

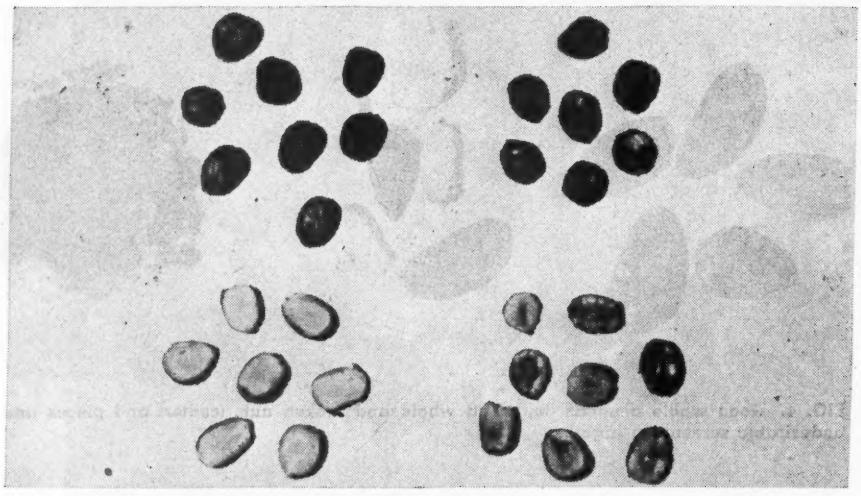


FIG. 6. Good whole filberts (upper left), bad whole (upper right). Below are good and bad halves after splitting for testing.

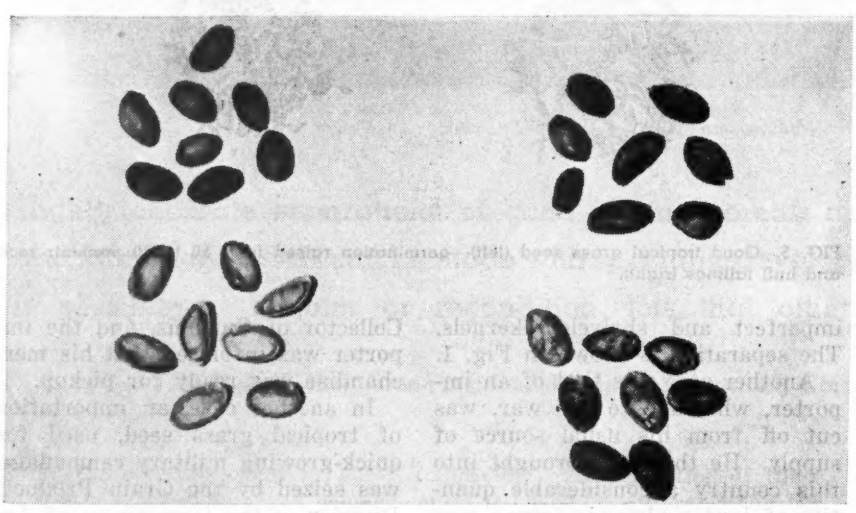


FIG. 7. Good whole pistachio nuts (upper left); bad whole (upper right). Good and bad halves are shown below.

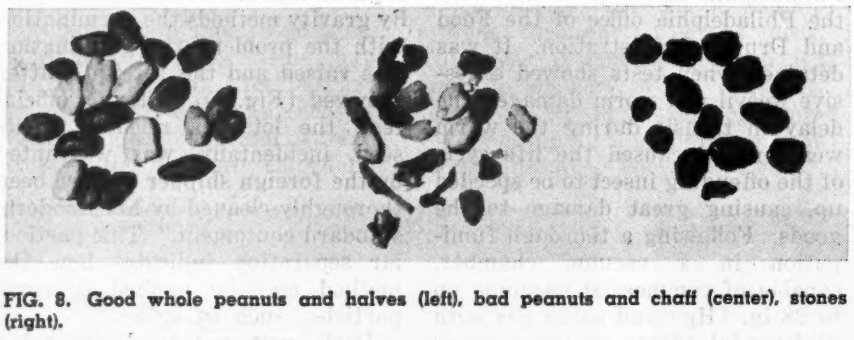


FIG. 8. Good whole peanuts and halves (left), bad peanuts and chaff (center), stones (right).

FIG. 9. Good pignolia nuts (left), pieces and hulls (second from left), stones and tack (second from right), fines and chaff (right).

Some Commodities Which Have Been Separated and Upgraded

Grain	Edible Beans	Gums
Corn	Kidney	Karaya
Wheat	White pea	Kauri
Rice	Black-eyed	Damar
Rye	Navy	Congo
Oats	Soya	Kopal
Barley	Mung	Tragacanth

Nuts	General Edibles
Almonds—shelled, unshelled	Chick peas
Filberts—shelled, unshelled	Peas
Chestnuts	Lentils
Brazil nuts—unshelled	Coffee
Pistachios—shelled, unshelled	Cocoa beans
Cashews—shelled	Pumpkin seed
Peanuts	Sunflower seed
Pinion nuts	Psyllium seed
Pignolias	

Spices	
Coriander	Cloves
Cumin	Allspice
Caraway	Mustard
Dill	Black pepper
Anise	White pepper
Thyme	Blue poppy
Oregano	White poppy
Marjaram	Whole nutmeg
Cracked ginger	

Planting Seeds	
Grasses	Parsnips
Flower seeds	Radish
Onions	Celery
Turnips	Squash
Cabbage	Beets
Spinach	Tomatoes
Lettuce	Carrots

Foodstuff reclamations which in the past have been considered too costly, too slow, and even impossible of accomplishment are now being done economically with a high recovery. Many companies have adopted the policy of having stored merchandise cleaned periodically, thus avoiding more costly shrinkage due to greater contamination. This procedure has been found to be good insurance.

A long record of "doing the impossible" includes the removal of moldy Brazil nuts in the shell, worm-cut and moldy almond (both shelled and unshelled), weevil-damaged pistachio nuts, moldy chestnuts, weevil-cut pignolia nuts, moldy and wormy filberts, and moldy and worm-drilled whole nutmegs. These are just a few of the growing list of commodities which can be handled by this custom processing plant.

It would be foolish to say that a cure-all has been found in all cases. There are those lots which are so badly damaged that hand work must be employed as an adjunct to machine cleaning, although considerably reduced by the latter. There are those also which hand labor alone can do. Occasionally, a lot is found to be so badly damaged by mold, fungus or insects that it is too far gone to be recoverable economically, even in part. These conditions often could be avoided if the knowledge of the causes and cures of foodstuff ills were more generally known and used.

Frozen Curds Boost Cheese Production

By J. C. MARQUARDT, New York State Department of Agriculture and Markets, Geneva, N. Y.

Enable cottage cheese manufacturers to meet demand during lenten season, which arrives before the period of heavy milk production. Author tells how curds should be frozen, how quality can be controlled

DURING the summer of 1944, more than 20,000,000 lb. of cottage cheese curds was frozen in New York State. In the future, this practice will increase. It is a means of meeting the demand for cottage cheese during the lenten season, which always arrives before the period of heavy milk production.

It is estimated that the volume of frozen cottage cheese curds will remain at 20,000,000 lb. per year until the postwar period. Then, more than 50,000,000 lb. of the material will be frozen annually.

Some manufacturers still have difficulty in freezing the curds, and it is the purpose of this article to help them solve their problems.

Cottage cheese curds are the only curds of importance frozen in quantity, and freezing is an outgrowth of storing for further use. The practice of holding the curds at low temperature, but above the freezing point, is gradually being discontinued. It involves holding the curds for 30 to 60 days at temperatures ranging from 28 to 32 deg. F. The hazard in this procedure is that the curds deteriorate rapidly when the temperature rises above 32 deg. F.

Preparing Curds

Pasteurized skim milk must be used in preparing the curds. A pasteurizing temperature of 165 to 170. deg. F., with a holding period of 15 seconds, has been satisfactory.

The curds to be frozen are prepared in the usual manner. They should be thoroughly washed and lightly salted, but never creamed. Lightly salted means using from 25 to 50 percent of the salt desired after the final salting and creaming of the thawed curds.

After the curds are packed in 50-lb. tins, immediate freezing is important. And the tins should be packed firmly to exclude air.

The curds should be in a zero to minus 20-deg. F. room within four hours after the tins have been filled.

The tins should be stacked open for 48 hours, with a fan operating in the room. After this period, the cans can be stacked in solid rows.

Thawing of the curds is a most important operation. This should never be done in hot air or hot water. The tins should be placed in water at room temperature. The water should be agitated, providing the facilities are available. The thawing water may freeze during the first 24 hours if agitation is not practiced. This is not serious. It requires two to four days to completely thaw out the curds.

The curds (free from frozen particles) are mixed with salt and cream. In some cases, these curds are mixed with freshly made curds.

Upon being thawed, frozen curds have a fine particle size, but this is not objectionable.

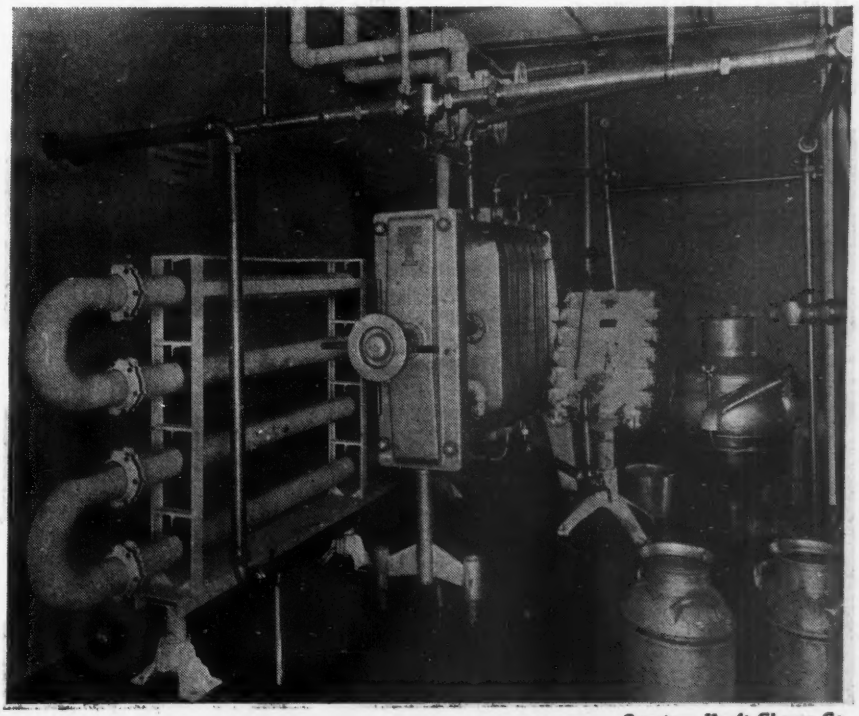
Quality Control

Off-flavors in remade frozen curds result from high salt and acid content, enzymes or bacteria. These defects can be avoided by salting as directed, and washing the curds freely to remove excess acid.

Enzymes and bacteria are controlled by proper pasteurization of the skim milk. Improper pasteurization or contamination after pasteurization are two leading factors in causing off-flavors in frozen cheese curds. The phosphatase test should be used to check pasteurization efficiency.

The writer has worked with cottage cheese curds experimentally and in commercial plants for more than 12 years. Present frozen methods are the result of efforts which as far back as 1932 appeared to be futile.

Extensive observations now are being made on the freezing of high-fat curds. The fat-protein-water ratio to insure a curd that can be successfully frozen after being cured is being studied. Freezing as an aid to grinding and processing offer possibilities.



Courtesy Kraft Cheese Co.

Equipment for pasteurizing skim milk used in preparing cottage cheese curds. The temperature is 165 to 170 deg. F., with a 15-second holding period.

Screw Conveyor Converted To Continuous Contact Freezer

Refrigerant circulates in screw, as well as in jacket around conveyor tube. In addition to freezing fresh foods, it can be used to cool cooked foods to be frozen and fruits and berries to be barreled

By F. W. KNOWLES, Manager, Northwest Baker Ice Machine Co., Seattle, Wash.

ATTEMPTS have been made to quick freeze foods by moving them through a refrigerated tube with a screw conveyor. But the water going in on the food to be frozen forms a sheet of ice on the inside of the tube and in a very short time prevents the operation of the unit. This difficulty is overcome by prefreezing the foods before passing them through the screw conveyor quick freezer. In prefreezing the food at a temperature of about 25 deg. F., the surface water on it becomes a glaze of ice. In this solid form, the water is not transferred to the inside of the tube of the screw conveyor quick freezer.

Another advantage is that this layer of glazed ice over the food protects it from the dehydrating effects of quick freezing.

An ordinary screw conveyor with an ammonia jacket around the outside of it is not a very effective freezer. However, when the screw itself is made into a freezing surface, results are greatly improved. A freezer of this type was built and put into use at the Northwind Packing Co., Sumner, Wash., for the 1944 season.

If used without a shaker prefreezer, the tube quick freezer clogs up with ice so badly that its use can be expected for only a few minutes. However, when material is brought through the freezing range on the shaker prefreezer and then fed into the tube type quick freezer, no frost problem is experienced. A portion of the ice glaze frozen on the food in the prefreezer is, of course, ground up in the tube type freezer. However, material moves through this so gently that no damage is experienced.

The shaker type prefreezer consists of a series of seven shelves 4 ft. wide by 10 ft. long, operated in separate units to cause the material to flow in opposite directions on alternate shelves. The food travels about 500 ft. per minute. The unit is kept at 25 deg. F., and as the food comes through the prefreezing operation it attains a temperature of 32 deg. or less. It is then fed to the screw conveyor type of quick freezer, which is maintained at –25 deg. F.

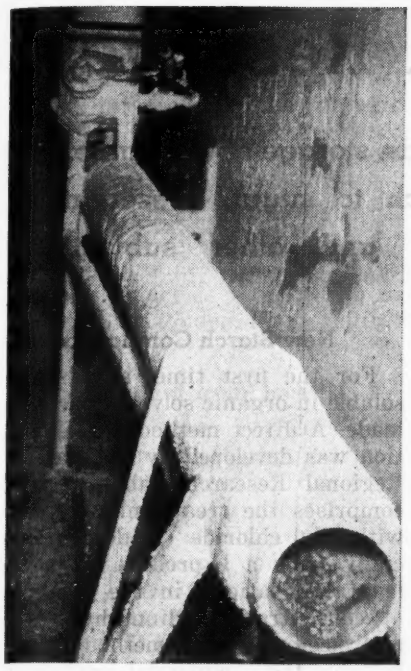
Prefreezer shaker in action on cut corn. This unit is used in conjunction with screw conveyor freezer.

The flow diagram shows the various steps in the process. As the food comes from the blancher it is put through a squirrel-cage dewatering device. From this it flows into a perforated shaker unit for additional dewatering. There it enters the shaker type prefreezer and finally is delivered to a chute leading it to the screw-type quick freezer.

Another development is the use of the conveyor-tube freezer in place of the shaker type as a prefreezer. This is done by raising the suction pressure on the tube freezer to give a temperature of 25 deg. F. As a prefreezer it is particularly suited for cooked foods before they are packaged such as chicken a la king, chop suey, squash, apple sauce, purees and other semi-fluid foods. Practically all of these "runny" foods can be brought down to 32 deg., or even below, before packaging, absorbing all the sensible heat and a portion of the latent heat. This will give the packer a very marked advantage in freezing time and contributes towards the production of a better product.

Cooling Cooked Foods

Northwind Packing Co. placed the tube freezer in the squash line and raised the temperature to 28 deg. Operating at that temperature, the freezer cooled 1,000 lb. of squash hourly through 100 deg. This in itself was an important



Screw conveyor type quick freezer in action on peas.

contribution to quick freezing of materials such as squash, apple sauce, purees, and even cooked frozen foods. In addition, the use of a freezer of this type, operating at the proper temperature, is contemplated on the precooling of strawberries, peaches, apricots, grapes and other fruits packaged or barreled or canned for jams, jellies, wine and other purposes.

At one plant in the Northwest, several thousand packages of squash, for instance, have been lost each year, due to the impossibility of getting the heat from blanching out of material in this form. Generally, squash is allowed to stand out in the open until it is cool enough to package. It is then placed in packages and put in the freezers where the exodus of heat from the center of the package is retarded by the freezing of the outside of the material itself, as well as by the many wrappings and contact with other packages standing between the centers of these packages and the heat absorbing medium, the coils. By bringing this material through the freezing range, in other words, absorbing the sensible heat and even taking out a small portion of the latent heat, which can be done in a tube-type freezer at the proper temperatures, several hours will be gained in the freezing of packaged materials, and even days will be gained in the freezing of barreled material.

Useful in Barreling

Anyone who is familiar with barrel freezing in the Northwest has seen barrels explode, barrels tapped to allow the pressure to bleed off, and barrels cracked and dripping from the pressure set up by fermentation of the materials in these barrels, due to the fact that no prefreezing or precooling was possible.

Easily Converted

The change from quick freezing in this tube type freezer to prefreezing will only mean the cleaning out of the unit and the changing of the suction temperature on the ammonia side of the tube freezer.

The principal advantages in this hookup are:

1. When using the shaker type of prefreezer the foods are in constant motion during prefreezing, hence they are cooled quicker without sticking to the surface of the prefreezing unit. By this action the food freezes in free pieces and not in a solid mass.

2. Each piece is protected and sealed by a glaze of ice. In this condition, the prefrozen foods are delivered to the screw conveyor type of quick freezing unit.

3. When using the tube type of freezer for precooling semi-liquid foods, practically all of the sensible heat and a portion of the latent heat is removed, reducing time of quick freezing, preventing spoilage in barreled stock, and generally improving quality.

It offers substantial possibilities for cutting labor costs as well as producing high-quality frozen foods.

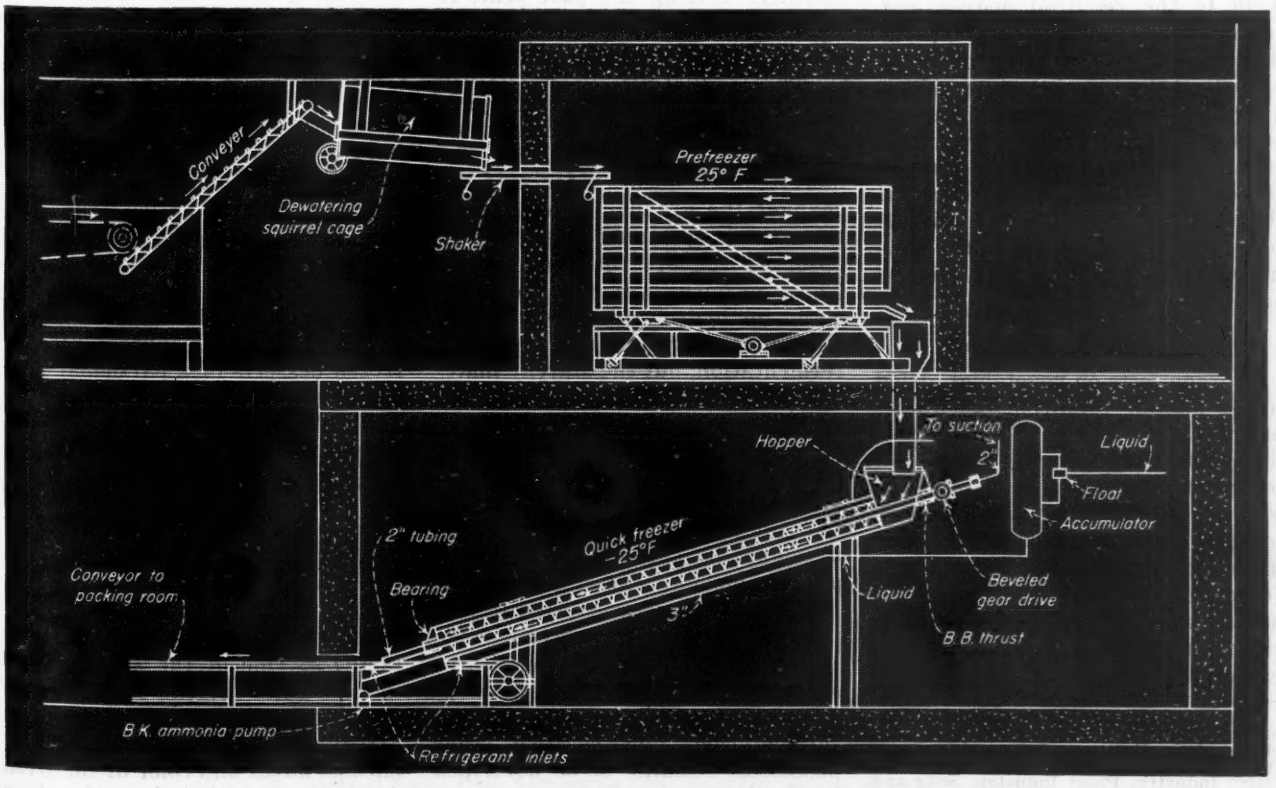


Diagram showing material flow from blancher to packaging.

New Know-How From Research

Recently discovered knowledge about compressing foods, storage of vegetables for dehydration, frozen fruit dessert, changing starch to sugar, preserving byproduct feathers, dry milk quality, bean rot and other subjects*

RESEARCH on procedures for compressing dehydrated foods in order to make the saving in bulk as great as the saving in weight has been broadened. The experiments were confined to the seven most important dehydrated vegetables, namely, potatoes, sweet potatoes, onions, cabbage, carrots, beets and rutabagas. Experiments were also made on spray-dried whole eggs. All except potatoes and eggs easily could be compressed by a relatively simple procedure, which comprises prewarming the dry product, pressing it into a 1- or 2-lb block with a hydraulic press, and immediately restraining and cooling the compressed block. A package made up of such blocks contained from 50 to 150 percent more net weight of food than one of the same size containing the uncompressed material in bulk. Dehydrated potatoes were compressed successfully in the laboratory by pressing them into blocks while slightly moist and then drying them to the required degree, but no practical means for carrying out this procedure on a commercial scale, without injuring the product, has yet been devised. A similar expedient was used for dehydrated eggs, but the difficulty of drying the compressed blocks is so great that a means of preparing satisfactory blocks directly from the low-moisture powder is still being sought.

Vegetable Storage

Storage tests on vegetables, dried under similar conditions to different moisture levels and stored at different temperatures in air, in oxygen-free nitrogen, and in nitrogen containing low proportions of oxygen, threw light on the question as to what factors are responsible for deterioration during processing and storage. It was demonstrated clearly that the keeping quality of carrots and cabbage can be improved greatly by further reduction of moisture content, and that this factor outweighs the influence of the surrounding atmosphere.

The conditions under which potatoes and onions have been stored prior to dehydration were found to influence the drying characteristics of these vegetables and the quality of the dried products produced. Much of the discoloration and low quality of some dehydrated potatoes was traced to an increase in sugar content of the raw potatoes caused by low temperature storage. It was shown that the bad effects of cold storage can be overcome in some measure by holding the potatoes at or above room temperature for about two weeks before processing.

Changing Starch to Sugar

Although raw starches are hydrolyzed to sugars in the digestive processes of many animals, it has not been possible to bring this change about in the laboratory until recently. During the past year, it has been discovered that uncooked wheat flour is readily, and almost completely, digested by a mixture of enzymic extracts from hog pancreas and the mold Aspergillus oryzae grown on bran. There was more than chemical evidence of the change; the gradual breakdown of the starch granules was actually observed under the microscope. These enzymes are used commercially for hydrolyzing the starch of grains to sugars preparatory to fermentation, but the starchy material must be cooked to get quick results. Even then it is unusual for more than 90 percent of the starch to be changed to fermentable sugars. All published data show that the hydrolysis of raw starches to sugars by enzymes is very slow and incomplete. The discovery that raw starch can be converted to fermentable sugars by enzymes outside of living organisms constitutes an important scientific development. Its practical application in fermentation, and possible other processes, remains to be developed by further research.

New Starch Compound

For the first time, allyl starch soluble in organic solvents has been made. A direct method of preparation was developed by the Eastern Regional Research Laboratory. It comprises the treatment of starch with allyl chloride (made commercially from a byproduct of petroleum distillation) in the presence of concentrated sodium hydroxide and acetone. This method makes possible the commercial production of allyl starch at a relatively low cost. The most promising use of allyl starch is as a coating material. When applied in solution to a surface of wood, paper or metal, it forms a smooth, glossy coating. When this coating is subjected to heat or long standing, it becomes very resistant to the agents that often damage varnished surfaces. It is no longer soluble in ordinary organic solvents, it is not affected by heat up to 200 deg. C., and it resists the action of hot oils and moderately concentrated acids and alkalis. A number of catalysts accelerate this polymerization or insolubilization of allyl starch.

Frozen Fruit Dessert

Velva Fruit offers commercial outlets for surplus fruits. It is a new high-quality frozen fruit dessert developed by the Western Regional Research Laboratory. It has been recorded in the U. S. Patent Office as a generic name that may be used by any manufacturer for frozen desserts of a particular type to distinguish them from other frozen desserts. Usually, Velva Fruit contains only pure fresh-fruit puree, sugar (enough to bring the soluble-solids up to 33 to 37 percent by weight), and 0.6 to 1 percent of gelatine in the form of a 10 percent solution. The milder flavored fruits require addition of a little citric acid, not over 0.25 percent, to give tartness. One of the specifications in the official record of the name is that Velva Fruit shall not contain artificial flavor or color. It has the natural flavor and color of the fresh fruit from which it is made, along

*Excerpts from reports to Administrator of Agricultural Research, U. S. D. A., by chiefs of the Bureaus of Agricultural and Industrial Chemistry, Animal Industry, Dairy Industry, Plant Industry, Soils and Agricultural Engineering.

with a pleasingly soft, smooth texture, essentially the same as that of ice cream. This texture is obtained by freezing the prepared mix in an ice cream freezer, which incorporates sufficient air into the mass to give an overrun or increase in volume, of up to 100 percent. When the desired overrun has been obtained, the temperature of the product is adjusted to between 18 and 25 deg. F. to facilitate drawing.

Differs from Ices

This new dessert differs from fruit ices and sherbets in having a much higher content of fruit puree and a much greater overrun. Ices and sherbets usually contain not more than 20 percent of fruit puree or juice by weight, whereas Velva Fruit contains over 50 percent. Sherbets have 25 to 40 percent overrun, while Velva Fruit has 80 to 100 percent. All of the nutritional qualities of the fresh fruit are well preserved in this new food, including a very large proportion of the fugitive vitamin C.

Superior quality in Velva Fruit depends to a large extent on the selection of fully plant-ripened fruit that will produce a puree having a pronounced, characteristic flavor. The kinds and varieties of fruits found thus far to be most suitable are strawberries, raspberries, dewberries and their hybrids, blackberries, red-fleshed plums, cantaloups, apricots, peaches and blends of berries with apples or pears.

In preparing the fruit puree, a substantial proportion of finely divided fruit solids should be included. A clear juice or thin puree lacks the body provided by fruit solids, which are essential to good quality. However, the fruit solids must be finely divided to provide a smooth texture in the dessert. If air is incorporated while the puree is being prepared, the vitamin content—and in many kinds of fruits the flavor and color—will be adversely affected. In preparing purees to be quick frozen for subsequent use in Velva Fruit manufacture, the flavor is best retained, as a rule, if heat treatment of the fruit or puree is avoided. It is desirable, therefore, to quick freeze the puree promptly and, at the time it is to be made into Velva Fruit, to defrost it by placing the closed container in a cool place to prevent deterioration from oxidative changes and microbial growth. Apricots and plums are exceptions to the rule, in that the flavor of apricots is improved, and the quality of plums is stabilized, without impairing their fresh flavor, by flash-heating to 190 to 200 deg. F. and cooling quickly. Some fruit, like peaches and light-colored sweet cherries, which have flesh that turns brown when exposed to air, are put into boiling sugar sirup for 2 to 5 minutes before being reduced to puree.

Powdered Jelly

A number of reasonably good fruit powders were prepared in spray-drying experiments on a laboratory scale. The successful production of whole-orange powder was the most significant achievement. The juices of some fruits were spray dried after the addition of sugar and pectin to produce jelly powders. These can be converted to jelly by heating for a short time in water. Several substances were found to be effective as drying aids for facilitating the desiccation of fruit juices to free-flowing powders.

CO_2 Reduces Bean Rot

In the control of watery soft rot of snap beans, which has come to be a very serious problem in shipments from southern Florida, promising results have been obtained in shipments with dry ice as a source of carbon dioxide. Use of 25 percent of carbon dioxide during the first 25 hours of transit, without refrigeration, reduced the loss by two-thirds.

Feathers Preserved

A simple and effective process has been developed by which wet-plucked chicken feathers may be preserved for industrial use. The process involves the use of 15 lb. of common salt and a pint of commercial concentrated hydrochloric acid, dissolved in 30 gal. of water for each 15 lb. of wet feathers to be preserved. A tight 50-gal. wooden barrel makes a convenient container. Thorough mixing was found to be essential to make certain that all feathers are exposed to the preservative. The solution costs initially about 1¼ cents per pound of wet feathers treated. The expense is further reduced by the fact that several lots of feathers can be preserved in the same solution before its preservative value is spent. The use of this preservative makes possible industrial utilization of millions of pounds of feathers formerly wasted or used for fertilizer.

Fish Impairs Turkey Meat

A study was completed of the effect of feeding certain fish products on the odor and flavor of roasted turkey. From the results obtained it was determined that fish oils of all kinds should be omitted from the diet of turkeys from eight weeks of age until marketing. If it is necessary to feed fish oils, the quantity should be restricted to ⅛ percent, or less, of the total diet. Only good-quality sardine and tuna fish meals should be fed to market turkeys beyond the age of eight weeks. When one or both of these meals are fed, the

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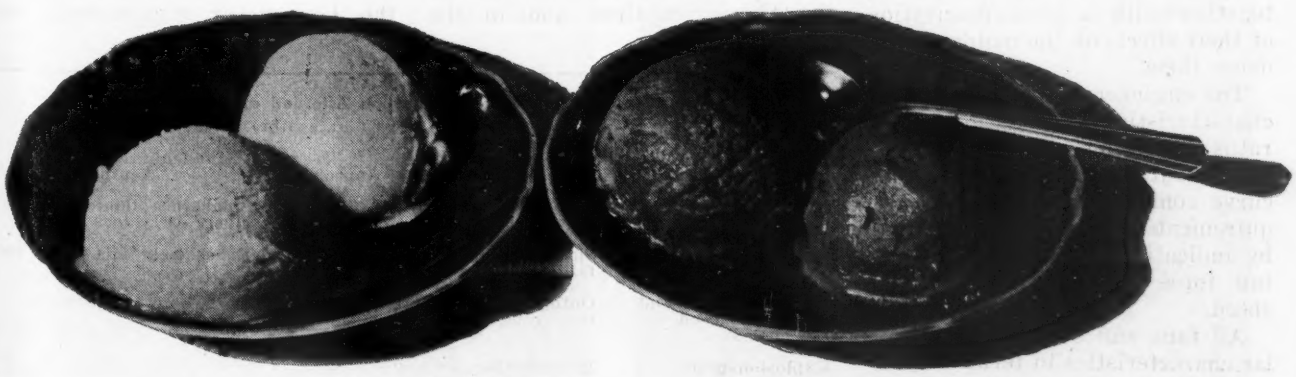


Two kinds of Velva Fruit, new frozen dessert—at left, apricot, at right, raspberry. Among the many items in this article are instructions for making such products.

Match the Motor to the Fan

To deliver the required volume of air, a fan must be driven by a motor whose operating characteristics match those of the fan. The author tells how to select the right motor and gives other pointers on fans and motors

By M. E. CUTTEN, Motor Division,
Lynn River Works, General Electric Co.

THERE is just one thing we want when we press the button that starts a fan. We want air, and plenty of it. The results that a fan is required to produce are obvious, but the factors influencing the proper selection of equipment for the job need some explanation. Since fans are driven by electric motors, let us review the fundamentals which form the basis for the selection of a motor-driven fan unit.

The fan builder decides what quantity of air must be moved per minute to produce the desired results, and, for the conditions involved, how much resistance there will be to the air movement. In other words, he determines the volume of air required and the pressure it must develop to overcome the resistance.

When these requirements are determined, the next step is to select from available fan designs a suitable fan to meet these conditions, and to select a motor large enough to drive the fan.

It would appear to be a simple matter to choose from a manufacturer's catalog a fan to meet the desired conditions. There are problems to be solved, however. Some of the complexities governing this selection can perhaps be made more easily understood by a discussion of the laws governing fans operating under different conditions, together with a brief description of their effects on the motors which drive them.

The engineer likes to picture the characteristics of rotating apparatus in terms of speed-versus-torque curves, and a speed-torque curve completely describes the requirements of rotating apparatus by indicating the amount of turning force required at any given speed.

All fans and blowers have similar characteristics in terms of power requirements. In other words, they all conform to speed-torque

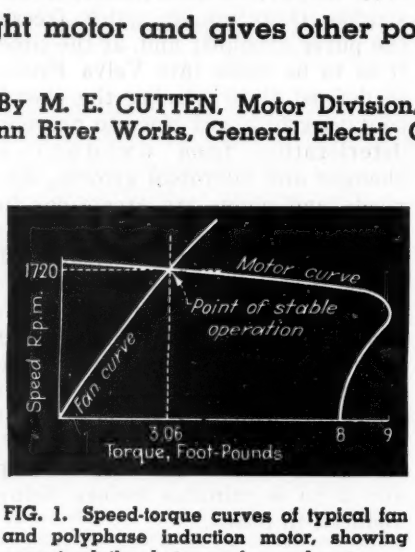


FIG. 1. Speed-torque curves of typical fan and polyphase induction motor, showing correct relation between fan and motor.

curves in similar shapes. A motor also has a definite characteristic curve, and in selecting the proper motor to couple to a given fan, it is necessary only to match the motor speed-torque curve with the fan speed-torque curve.

Working from the quantity of air to be moved, we can follow through the steps in selecting a fan and the correct motor to drive it. The quantity of air moved is, in general, directly proportional to the speed of the fan operating against a fixed resistance. So for any given fan, if you want twice as much air you must run the fan twice as fast, and for half as much air you must run it half as fast. The other relationships, however, do not follow such simple laws. By changing the volume of air to be moved, and consequently the fan speed, you make more than proportional changes in the torque required and in the power to be supplied by the motor. The torque required to drive a fan varies as the square of the speed, so that to run a fan twice as fast requires four times the torque from the motor. Also, the power required to drive a fan varies with the cube of the speed, so that doubling the fan speed will increase the required horsepower eight times.

One of the considerations in selecting fan speed is fan noise. The noise is proportional to the tip speed of the fan, and this varies with the diameter of the fan and with the rotating speed.

A fan, therefore, must be selected whose speed and diameter are sufficient to deliver the required quantity of air at the proper pressure, but with a tip speed low enough so that fan noise is not objectionable. This fan is then required to operate at a given speed to deliver this quantity of air, and since the power required to drive the fan is proportional to the quantity of air delivered and to the pressure, the full-load horsepower and the speed rating of the motor required are determined.

The horsepower rating of a motor combined with the speed rating is a way of saying that the motor will have a certain turning force, or torque, at that speed, and that the motor can supply this force continuously at that speed. From the horsepower requirements we

Table I—Motor Enclosures, Protection Afforded and Limitations.
(For a 1-hp., 1,800-r.p.m. motor)

Enclosure	Protects Against	Approx. Wt.	Inadequate Protection Against
Open	Dripping liquids and falling objects	67 lb.	Splashing liquids, excessively dirty locations
Splashproof	Splashing liquids and falling objects	75 lb.	Excessively dirty locations
Totally enclosed and totally enclosed fan-cooled	Outdoor atmosphere in any position	84 lb.	Best known protection
Explosion-proof	Inflammable gas and combustible dust atmospheres	84 lb.	. . . . .

can establish the full-load-torque point and the full-load-speed point which are required to properly operate the fan.

When we select a motor listed at the proper horsepower and speed, we really select a motor having a speed-torque curve which will intersect the fan speed-torque curve at a suitable point where the speed and torque requirements of fan and motor coincide. For example: A 1-hp. motor has 3.06 ft.-lb. of torque at 1,720 r.p.m. This motor will operate a fan whose torque requirements are 3.06 ft.-lb. and, operating at 1,720 r.p.m., will deliver the amount of air required. The curves in Fig. 1 illustrate this example.

There are many types of motors available which will have the proper full-load torque at the proper speed to intersect the fan curve as required. The characteristic curves in Fig. 2 show some of the available types. The chief factor governing the selection of one of these types of motors is the power supply. Motor-driven fans may be used on single-phase, three-phase, or d.-c. power equally well, providing that the motor is properly selected.

From this discussion, you can see that by varying the volume of air to be delivered, or the pressure that the fan must develop to deliver air against resistance, or by changing the diameter of the fan, you can change the shape of the speed-torque curve and, therefore, change the requirements for a motor. The principal point to remember is that the general shape of this curve will always be the same for the same general class of fan, and when you have determined the speed at which a fan is to run and the torque requirements at that speed, you have established the requirements for motor power.

For direct-drive fans, the speeds at which the fan may operate are limited by available motor speeds. In general, these motor speeds are graduated in steps between 450 and 3,600 r.p.m. Many other speeds may be obtained, however, by using a belt-driven fan or blower where other mechanical conditions will permit. Direct-connected fans operate at a given speed and deliver a given air flow, and there is little question of overloading the fan and the motor under these conditions. In the case of a belt-driven fan, however, pulley ratios may be changed and the fan driven at a higher speed. Such a change increases the amount of noise and, as previously pointed out, increases the load on the motor eight times the proportional increase in the speed of the fan. Any changes of this kind may seriously overload the motor and cause it to burn out. Another practical condition illustrating the caution which must be used in fan applications is in a case where a propeller fan is required to exhaust air from a building, and at the same time operate against the prevailing wind. If the additional pressure necessary to operate the fan against the prevailing wind is not taken into consideration, it can easily overload the motor and cause premature failure. Again, motor horsepower is increased more than in direct proportion to an increase in fan pressure.

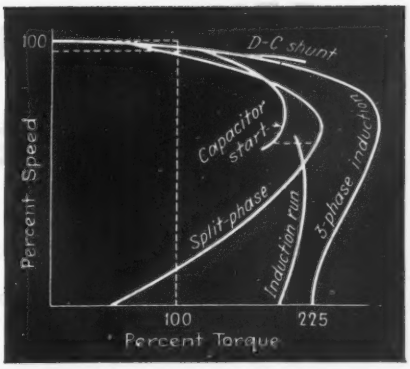


FIG. 2. Speed-torque curves of different types of motors.

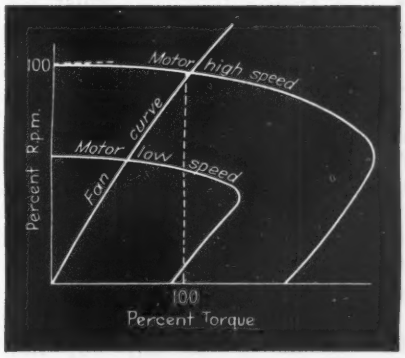


FIG. 3. Speed-torque curves of a two-speed motor-driven fan.

In cases where two different conditions prevail so that a high volume of air is required to meet one requirement and a small volume is sufficient for another, a two-speed motor-driven fan may be used to advantage. Again, in a given system the fan will deliver half as much air at half the speed. The motor for such a unit is so designed

(*Turn to page* 174)

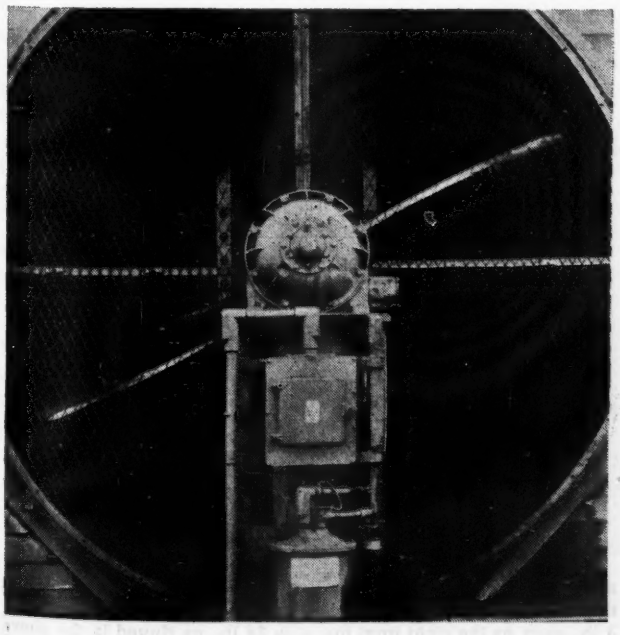


FIG. 4. This propeller fan is driven by a totally enclosed motor.

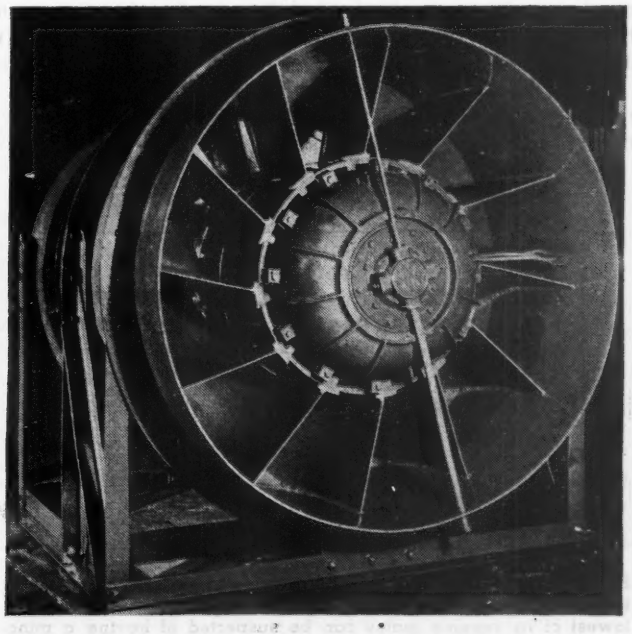


Fig. 5. Axial-flow fan driven by a totally enclosed motor.

Hints on Keeping Truck Tires Running

The comparative-air-loss system helps to prevent roadside flat tires. Also steel tape device makes it easy to match dual rear truck or trailer tires

FLEET owners in the food field now realize that they must use every ingenuity at their command to keep their truck and passenger-car tires running until the supply again meets the demand. They know this from the increasing difficulty in obtaining new tire certificates from the OPA. They must prove that tires unfit for further service were recapped at least twice and not otherwise subjected to abuse.

They know also how difficult it has become to actually buy new tires, even after they have obtained certificates, because of the reduced quota available for purchase. So it becomes a must to get every last mile of service out of tires now in their possession.

More Serious in Summer

With hot weather coming on, the situation becomes even more serious because overheating is a deadly enemy of synthetic tires, especially in the larger sizes. Abuses which may not have caused the tires to fail in the cold winter months will certainly make them blow out in the hot months of June, July and August.

Much has been said and written on the subject of why and how overspeeding, overloading and underinflation result in premature tire failures. In its issue of December, 1944, FOOD INDUSTRIES showed by tables, charts and illustrations of tires that have failed just how these three cardinal sins of tire abuse cut down tire life.

Assuming that the wise fleet owner in the food field will make certain that such abuses are not now permitted in these critical days, the purpose of this article is to point out certain maintenance methods by which others have been able to get the utmost out of their tires. One of these methods has been named the "comparative-air-loss system."

Detects Slow Leaks

When the operating factors of load, speed and inflation are within the safety factor of the tires so as to give maximum life, this system detects innertubes which are leaking air. And if the leaks are stopped before the truck or car leaves the garage, the tubes are less liable to go flat out on the road. If a tire is run flat, even for a short distance under load, both the tube and the tire carcass usually are ruined and must be disposed of as a total loss.

The system is based on the fact that innertubes lose air only in three ways: (1) Through the porosity of the tube rubber itself. (2) Through the valve. (3) Through a puncture by a nail or other sharp object driven into the tube through the tire tread or sidewall.

There is a small constant loss of air from tubes because of the porosity of the tube material itself. When this loss of air becomes excessive for any one tire on a vehicle (as compared with other tires on the same vehicle), it is a very good indication that the tube having the excessive air loss has a puncture of some sort, provided the valve caps of all tires are screwed down tight.

Even if the valve core of the tire valve itself is leaking, the valve cap, which has a rubber air sealing washer of its own, will prevent any loss of air at the valve. Thus if a tube with the valve cap properly screwed down is losing more air than can be accounted for by the porosity of the tube itself, it must have some sort of a puncture which permits the excessive amount of air to escape.

It is also a well-known fact that the puncture of a tube does not make it go flat at once. If a nail is driven through the carcass tread so that it pierces or punctures the tube, the elasticity of the rubber will nearly seal the hole around the nail.

Only a small amount of air will escape around the hole until fatigue breaks down the rubber around the edges of the hole and allows all of the air to flow out. It is this final break which has caused the erroneous impression that a small puncture will cause a tube to go flat at once.

In fact, most punctured tubes do not go flat for days, or even weeks. In a test of punctured tires vouched for by the Office of Defense Transportation in its report outlining

VEHICLE No.

TRUCK AND BUS

Comparative Air Loss System

TIRE PRESSURE RECORD

DATE CHECKED	FRONT		1ST. REAR AXLE				2ND REAR AXLE				SPARE
	RIGHT FRONT	LEFT FRONT	RIGHT REAR OUT SIDE	RIGHT REAR IN SIDE	LEFT REAR OUT SIDE	LEFT REAR IN SIDE	RIGHT REAR OUT SIDE	RIGHT REAR IN SIDE	LEFT REAR OUT SIDE	LEFT REAR IN SIDE	
3/21/44	68	70	69	66	(61)	67	70	68	66	69	

VEHICLE No.

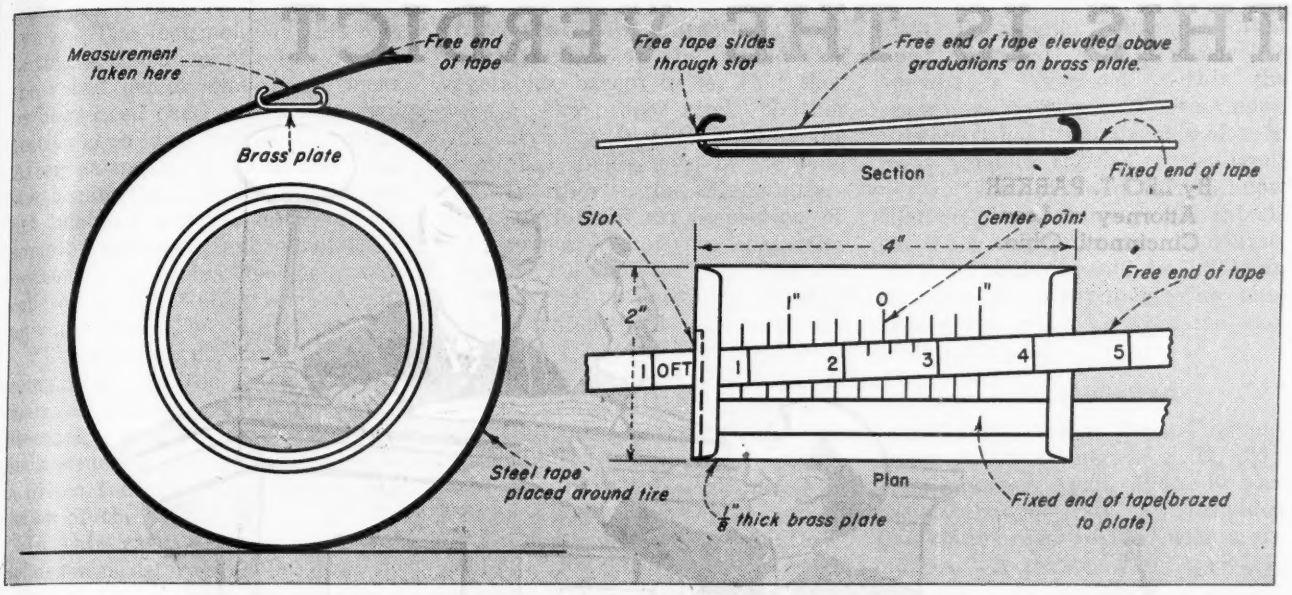
PASSENGER PRESSURE

Comparative Air Loss System

TIRE PRESSURE RECORD

DATE CHECKED	LEFT REAR	RIGHT REAR	RIGHT FRONT	LEFT FRONT	SPARE
3/28/44	30	28	(24)	27	29

Recording sheets used in comparative-air-loss system to detect leaking tubes. Any truck tire that has 5 lb. less pressure than the lowest of its running mates can be suspected of having a puncture and should be removed for examination and repair. Such a tire is the one with 61 lb. pressure, as ringed in the above form at the left. On passenger car tires, the tell-tale pressure difference is 3 lb., such as the right front tire with 24 lb., as ringed in the above form at the right.



Details of the construction and use of a steel tape device to measure the circumference of truck tires in order to properly mate them for mounting as duals. The sketch at the left shows how the tape is wrapped around the tire at the center of its tread. The free end of the tape is pulled taut through a slot in the plate and the circumferential length in feet and inches read directly on the graduations on the plate, as shown in the sketch at the right. The circumference of the tire being measured, as shown by the position of the free end of the tape, in relation to the fractional inch graduations on the brass plate, is 10 ft. 2½ in.

the comparative-air-loss system, only five out of 135 passenger car tires and tubes into which nails were driven went flat within the first day.

In conducting another similar experiment, a 4-penny nail was driven into each of the four tires of a passenger car at the same time. The vehicle was then operated in its customary manner. Tire No. 1 ran over 2,300 miles before it suddenly went flat. Tire No. 2 suddenly went flat after 3,900 miles, and Tire No. 3, after 5,100 miles. Tire No. 4 had not gone flat after 8,480 miles, when the test was discontinued.

If the excessive air losses from Tires Nos. 1, 2 and 3 had been noted after the first day's operation and the punctures repaired, it would have been possible to avoid all three sudden flats and any damage to the tubes or tires resulting therefrom. This is what the comparative-air-loss system aims to accomplish.

As examples of results obtained through the use of the system, one large bus company operating 139 buses reported to the ODT that it had reduced its roadside tire changes to an average of one change per 212,000 vehicle miles. Another company operating 15 buses daily increased the average mileage between roadside flats to 494,000.

How System Works

In operation, the system consists of gaging the air pressure in all the tires of a given vehicle at certain specified times and recording the air pressure found in each tire on a form similar to that shown in one of the accompanying illustrations. The specified times may be once a day at the beginning of the day or before every trip on trucks or tractors and trailers used on long runs.

The gaging times may be set to best suit the convenience of the fleet owner. However, to get the best results in increased tire life, the gagings should be made a routine procedure and should be made at least once every day.

To start off the system, the tires should be inflated to the desired pressure and all the valve caps screwed down tight after making sure that each valve cap has its own air-sealing rubber washer. Then when the tires are gaged the next day, the pressure found in each should be written down on the same horizontal line as shown on the accompanying reproduction of the same forms.

Next, the individual tire pressures should be compared. Any passenger car tire that is 3 lb. below the lowest of its running mates and any truck or trailer tire that is 5 lb. below the lowest of its running mates can be suspected of having a puncture. So the tire and tube should be removed for examination and repair.

That's the comparative air-loss system in its entirety, except for a precautionary procedure to take the tire pressures only when the tires are cool, as at the beginning of the day or the start of long trips. This is necessary because the pressure increases as the tire is heated under operating loads, and the loads of front and rear tires are not the same. Accordingly, pressure taken while the tires are hot would be misleading so far as the comparative-air-loss test is concerned. Also when foreign objects such as nails are removed from a tire tread, the vehicle should not be operated until the comparative-air-loss test has been made. Otherwise, the removal of the piercing object may be analagous to pulling the plug out of a hole and changing a slow leak into a fast leak.

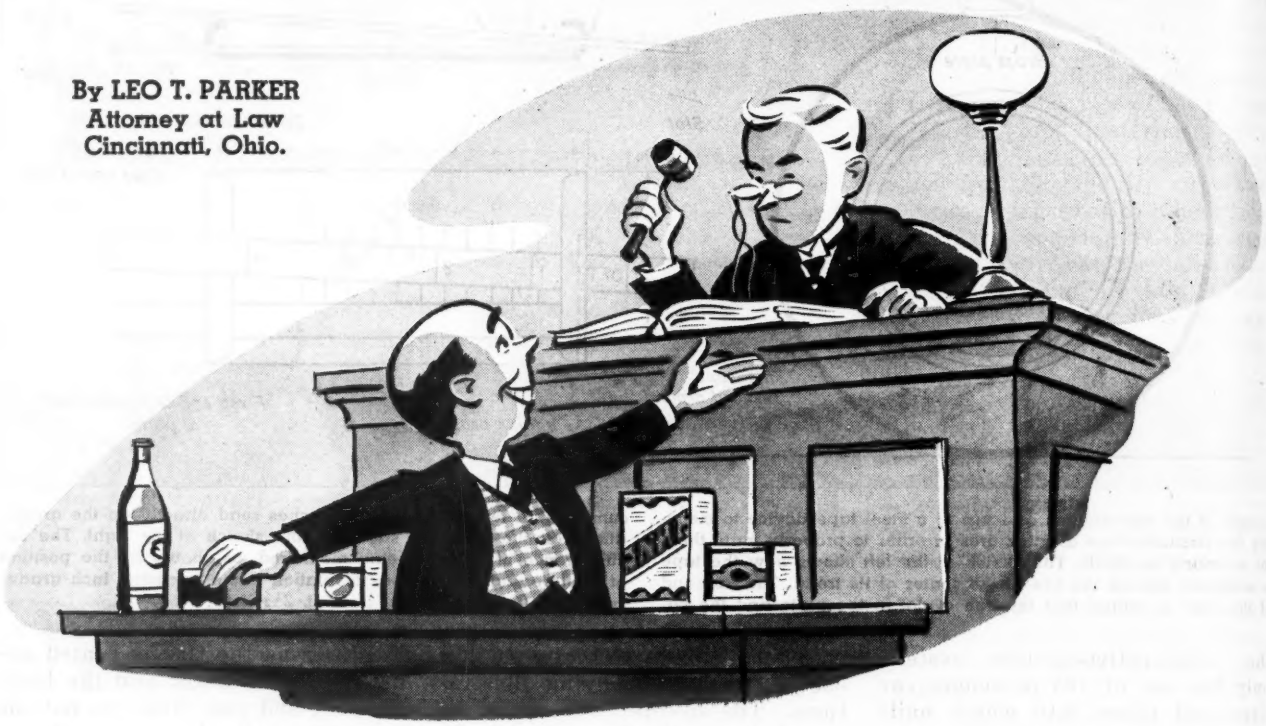
Matching Dual Tires

Another hint to increased tire life is the proper matching of dual tires so that one tire, because of its larger diameter, does not take a disproportionate part of the load. One of the easiest ways to match dual tires is by measuring the circumference. Two tires with the same circumference will have the same rolling radius and will carry an equal proportion of the axle load when mounted side by side. By measuring the tires in the tire room, before they are mounted on the vehicle, and marking the circumference (such as 10 ft. 3 in.) in yellow chalk on the sidewall, it is easy to select two tires of the same rolling radius.

To mate duals properly, the circumferential difference in measurement should not be more than 1¼ in., with the smaller tire being placed on the inside to compensate for road crown.

THIS IS THE VERDICT

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio.



Higher court decisions in food cases reveal basic principles that are as significant in quality control as they are in legal action

EACH year the higher courts render decisions which, in one way or another, concern a majority of manufacturers and sellers of food products. Many of these modern decisions reverse older law. Despite adverse decisions, which may have been rendered during 1944 against manufacturers and sellers of food products, liability may have been avoided had it been proved that the consumer failed to exercise ordinary care to learn that the food was unfit for human consumption. This is so even though the manufacturer or seller was negligent, or violated a valid law.

For illustration, in Leonardi versus A. Habermann Provision Co., 56 N. E. (2d) 232, reported October, 1944, the court said:

"One who eats pork with the knowledge or means of knowledge that it has not been properly cooked is guilty of contributory negligence precluding a recovery from the seller of such meat."

To the same effect were the decisions in the cases of Canton Provision Co. versus Gauder, 130 Ohio St. 43 (liver pudding manufactured by packer contained the ordure of a rat); Great Atlantic and Pacific Tea Co. versus Hughes, 3 N. E. (2d) 415 (pork sausage poisoned and putrified causing food poisoning or food infection); Portage Markets Co. versus George, 146 N. E. 283 (blue-looking unwholesome veal).

Seller Liable to Purchaser

Generally speaking, only a purchaser has a legal right to sue for alleged illness caused by unwholesome food.

For example, in Vaccarino versus Cozzubo, 31 Atl. (2d) 316, reported July, the higher court held that ordinarily a seller of unwholesome food cannot be held liable to any person except the purchaser. This court said:

"An implied warranty of wholesomeness of food does not inure to the benefit of any consumers other than the purchaser, for any such consumers have no privity of contract with the seller."

However, this court held that the seller may be under certain circumstances liable for sickness caused a husband by unwholesome food purchased by his wife.

The fact that many higher courts actually grant verdicts in favor of consumers, who sue sellers of unwholesome food, is enough to justify every effort to compromise such suits where the testimony evidently is against the seller, rather than defend the suit at great inconvenience, time loss and expense through several courts.

With this situation in mind, we shall review a few modern higher court decisions rendered against food sellers in order to clearly illustrate the kind of testimony likely to result in unfavorable verdicts.

First, it is important to know that modern higher courts consistently hold that a claim of illness from eating a food product, sold by another, is not sufficient to establish the allegation that the food was unfit for human consumption. However, testimony of several witnesses, tending to show that they all became sick, is usually sufficient to justify a jury to declare a judgment in favor of the complaining consumer.

For illustration, in Great Atlantic and Pacific Tea Co. versus Dupee, 30 S. E. (2d) 365, reported July, 1944, it was shown that a retail dealer who bought meat from a farmer was held liable for $250

damage for illness caused a consumer. The testimony in this case is that a consumer purchased from the retail dealer some souse meat, or hogs-head cheese. It looked perfectly good and tasted all right. After eating a little of the meat she became very sick. Her father, her husband and her daughter ate some of the meat, and all of them became sick. This testimony, of course, proved that the meat was unwholesome. The court said:

"The several persons being accompanied by the same general manifestations such as pains in the stomach, nausea, and vomiting, such evidence was sufficient to make a prima facie case . . . against the seller of the meat."

In this case, negligence of the sellers was established because the seller failed to have the meat inspected according to a city ordinance. This court said:

"Negligence of the defendant (seller) in selling the meat without having it inspected as required by the city ordinance clearly appears. . . ."

Thus, failure of either a retail dealer or manufacturer of food products to conform with valid inspection laws may result in an unfavorable verdict in suits of this nature.

Manufacturer Fails to Use Inspection

Modern higher courts consistently hold that manufacturers of food products should use great care, and particularly apply equipment and methods designed to eliminate foreign substances from their products. Failure to do so may result in unfavorable verdicts in subsequent suits for damages, especially when such negligence is directed to the attention of the higher court.

For illustration, in Paolinelli versus Dainty Foods Manufacturers, Inc., 54 N. E. (2d) 759, reported June, 1944, suit was filed against a manufacturer of noodle soup to recover damages for the death of a child, choked by a bone while eating soup. During the trial the testimony proved that the product was prepared and marketed in a sealed vacuum-packed container and delivered to a retailer, who, in turn, sold it to the consumer. When received by the consumer, therefore, the soup was necessarily in the same condition as when distributed by the manufacturer. These facts convinced the court that the soup could not have been tampered with between the time it was sold by the manufacturer and received by the consumer. Further testimony proved that the manufacturer made no inspection of the dehydrated vegetables, except to see that they were of the proper kind. Neither was there any inspection as to the other ingredients used in the soup mix. In other words, the manufacturer performed no inspection of his product, or of the composite product. He made no provision for grinding up or removing foreign objects, which could have been contained in any of the original containers or ingredients. Particularly, in view of this testimony, the jury held the manufacturer liable for death of the child. The higher court approved the verdict and said:

"These ingredients were handled in the open and the final mixture, including the chicken fat, mixed in an open mixer without any provision for grinding up or removing foreign objects which could have been contained in any of the original containers or ingredients."

It is important to observe that, in this case, the manufacturer attempted to avoid liability on the contention that his product was inspected by government agents. In respect to this contention the higher court said:

"It is well established that government inspection is not a substitute for due care. In our opinion there was sufficient evidence to warrant the jury in finding that plaintiff proved defendant was negligent in the manufacture, preparation and inspection of its product."

In Kurth versus Krumme, 56 N. E. (2d) 227, reported September, 1944, the higher court held that meat infected with *Trichinellae spiralis* is "diseased" within the state pure food laws. Furthermore, this court held that the sale of such meat renders the seller negligent per se, even if he does not know that the meat is diseased or infected. This decision means, of course, that the seller would be liable in damages to any person who purchased the meat and became sick after eating it.

Failure of the manufacturer of food products to conform to valid city or Federal inspection laws may result in unfavorable verdicts in suits for damages resulting from eating foods claimed to be unwholesome and to cause illness.

Claim Outlawed

In Carrier versus State Compensation Commissioner, 28 S. E. (2d) 921, reported April, 1944, it was shown that a state law provides that claims must be filed within six months. A person died April 21, allegedly from the effect of eating food containing a poisonous substance. A claim or suit was not filed until eight months later.

The higher court held that the claim was filed too late and held in favor of the seller of the food.

Bottle Explodes

In Escola versus Bottling Co. of Fresno, it was shown that a bottle exploded in the hand of a consumer. She sued the bottler for damages. The bottler introduced a witness who testified that the bottle may have been weakened by a jar after it left the bottling plant.

The lower court allowed heavy damages, but the higher court reversed the decision, saying:

"There is expert testimony, based upon a description of the manner in which the bottle broke, that the breakage could have been due to some external blow and not from internal pressure or thermal change."

In the case of Gerber versus Faber, 54 Cal. App. (2d) 674, the bottler of root beer sold to an independent distributor, who sold to the proprietor of a store. A consumer was injured when the bottle exploded while he was removing it from the refrigerator, to which all customers had access.

The higher court refused to hold the bottler liable in damages and explained that the bottler had parted with possession and control of the bottle when he sold to the independent distributor; that the bottle in question may have been on the distributor's truck for a week; that there was no evidence of careful handling by the distributor or by the retailer.

The court held that under such circumstances it would be improper

to infer that the bottler was negligent to the exclusion of the distributor and retailer.

Modern higher courts hold that a bottle, or other container of food, may burst only through one or more of several causes: (1) the pressure under which the container was filled was greater than it could stand; (2) pressure thereafter increased to the bursting point; (3) if the pressure was a safe one in the beginning and was not increased, the container burst because of the manner in which it was subsequently handled, which could happen whether it was with or without a flaw; (4) if the container was defective.

Recently a higher court rendered a new decision having important legal effects, and destined to greatly assist companies in winning suits of this nature.

In Bubble Co. versus Lewis, 163 S. W. (2d) 875, it was shown that a consumer sued a company for damages for personal injuries sustained as the result of an explosion of a bottle. The testimony proved that the consumer had placed the bottle in a refrigerator and that when it exploded it was cold.

In view of this testimony, although the lower court held the company liable, the higher court reversed the verdict, saying:

"It is a scientific fact of common knowledge, of which this court takes judicial cognizance, that if the bottle was cold, the internal pressure was materially less than it was when it was warm."

Therefore, according to this decision, it is quite apparent that when a suit is filed against a company, by a consumer, to recover for injuries caused by an exploding container, the company may win the suit by proving that the bottle did *not* explode when it was warm but *did* explode when it was cold.

Retail Seller Liable

Seldom do the higher courts hold retail sellers strictly and entirely liable and responsible for injuries or illness resulting to consumers of canned foods. But in a recent higher court decision the retailer and not the canner was held directly responsible and liable.

For example, in Wolfe versus Atlantic, 56 N. E. (2d) 230, reported Sepember, 1944, the testimony as presented before the court disclosed that a woman purchased an order of groceries from a grocery store. Included in the order were two cans of peaches.

After consuming the second helping the woman noticed a part of a worm in a portion of the peach which she was about to eat. She immediately because nauseated and began to vomit. This nausea and vomiting continued for several days.

She sued the grocery company for damages. The counsel for the grocery company argued that it could not be held liable because it did not can the peaches and its officials had no opportunity to know or realize that the canned peaches were not pure and proper for consumers' food. Notwithstanding this argument, the higher court held the retail grocery company liable in $250 damages, and said:

"The sale of diseased, corrupted, adulterated or unwholesome provisions, although in a sealed original package, without making the condition thereof known to the buyer . . . constitute negligence per se on the part of the seller."

An important element in this and similar suits is that the court allowed the mother and daughter only $250 damages, although they sued for considerably heavier damages.

Accidental Death

A modern higher court held that death from food poisoning legally is "accidental" within the double indemnity provision of a life policy.

In Lipscomb versus Equitable Life Assur., 18 So. (2d) 167, reported July, 1944, it was shown that two persons obtained stuffed crabs at a local delicatessen for their evening meal. Shortly before 10 o'clock that evening they both became sick. The following morning one person died and the other was unconscious. The person who died had an insurance policy. The principal amount of the policy was $25,000, with a double indemnity provision for accidental death. In holding the insurance company liable for $50,000 the higher court said:

"Death directly from poisoning following the unintentional eating of bad food is effected by accident, or is the result of accidental means."

A lower court verdict for damages caused by an exploding bottle was reversed when it was demonstrated that the bottle burst when it was cold, but not when it was warm, and thus could have been no fault of the bottler.

Container Injuries

Recently a higher court held that a food seller is not liable for defects in cartons in which food is placed for transportation, or shipment.

For illustration, in Rockwell versus Queen City, 53 N. E. (2d) 528, the court records show facts, as follows: A consumer purchased food which was contained in a carton. While carrying it to his home the carton collapsed, the bottles fell to the sidewalk and were broken, and the purchaser was injured by flying glass. The higher court held the manufacturer *not* liable, and said:

"Plaintiff (consumer) alleges merely that defendant (manufacturer) put the carton in circulation. If these be the ultimate facts, they fail to state a cause of action on an implied warranty as to fitness for a particular use or in an ordinary negligence case."

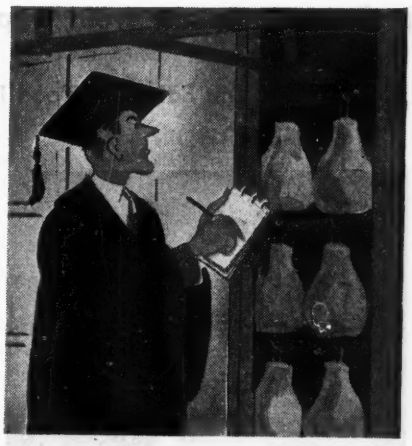
Also, see Butler, 180 S. W. (2d) 996, reported August, 1944.

The lower court held a consumer entitled to heavy damages for injuries caused by an exploding container. The manufacturer appealed to the higher court and contended that it should not be held liable because it did not manufacture the container. The higher court reversed the verdict of the lower court and held the manufacturer not liable. This court stated important law, as follows:

"We have no authority where, under the rule of implied warranty, manufacturers have been liable for damages arising out of defective containers of foods where the injury inflicted was not caused by the consumption of the food. The reasoning against such application of the rule is clear. The container is not intended to be taken internally by the consumer. The food is the article that is to be consumed by human beings."

What It Takes To Be A Food Technologist

Michigan State's new four-year course offers the food industry a clear picture of the technical preparation to be expected in the young men who enter the field by way of a college degree



A COURSE in Food Technology has been added to the curricula at Michigan State College. It is largely an integration of basic or fundamental subjects selected from the curricula of the schools of agriculture, engineering, and arts and science, plus the addition of ten new subjects selected especially for the food technologist.

The course is designed to provide training in the more technological aspects of dairy manufactures; handling and processing of fruits and vegetables; selecting, storing and processing meats; and cereal manufacture. The curriculum is based upon the application of the principles of the sciences—such as chemistry, physics, biology, bacteriology and chemical engineering—to the manufacture, processing and preservation of agricultural products.

During the junior and senior years, students will elect subjects that will be of most value in preparing for work in one or more branches of the food industries. If a broad training in the general field of food technology is desired, or if the student contemplates a research career, he is advised to plan on a five-year course leading to the masters' degree.

Michigan State College requires each student in this course to spend at least six months in gaining practical experience in food processing or manufacturing plants.

Facilities for instructional work include commercial equipment for manufacturing the various kinds of dairy products, a complete canning factory—which is in operation almost continuously during the summer and fall months, processing fruits and vegetables for use in the college halls — pilot-plant installations for dehydration, freezing and manufacture of horticultural products, and a meat laboratory completely equipped for slaughtering and processing.

Required

Freshman Year

Written and Spoken English
Biological Science
Effective Living
Military Science
Physical Education
Development of Agriculture
General Chemistry
College Algebra
Trigonometry
Analytic Geometry

Sophomore Year

History of Civilization
Literature and Arts
Social Science
Military Science
Nutrition
Quantitative Analysis
Biological Chemistry
Dairy Husbandry
Mechanical Drawing
General Horticulture
Calculus

Junior Year

Selection and Preparation of Meats for Processing
General Bacteriology
Plant Chemistry
Chemistry of Nutrition
Dairy Chemistry
Physical Chemistry
Mechanics and Heat
Heat and Electricity
Sound and Light

Senior Year

Geography of Food Supplies
Food Preservation and Decomposition
Introduction to Accounting
Food Analysis
Unit Operations for Chemical Engineers
Applied Refrigeration

Recommended Electives

General

Building Materials and Methods
Fermentation Bacteriology
Problems or Laboratory Methods in Bacteriology
Business Organization and Management
Business Law
Contracts and Specifications
Technical Writing
Business Speaking
Soil Science

Dairy Manufactures

Dairy Bacteriology
Elements of Dairy Technology
Dairy Sanitation
Market Milk
Ice Cream Manufacture
Advanced Dairy Products Judging
Butter Making
Cheese Making
Special Problems
Advanced Dairy Technology

Horticultural Manufactures

General Plant Physiology
General Plant Pathology
Diseases of Fruits
Diseases of Field and Garden Crops
Elementary Entomology
Horticultural Products
Preservation of Fruits and Vegetables
Geography of Horticulture
Storage and Transportation of Fruits and Vegetables
Fruit Handling
Special Problems

Meat Manufactures

Mammalion Anatomy
Avian Anatomy
Meat Selection and Cutting
Meat Production
Special Problems
Marketing of Poultry
Poultry Management

Cereal Manufactures

General Plant Pathology
Diseases of Field and Garden Crops
Elementary Entomology
Cereals, Grain Judging, and Marketing
Special Problems

Above are the subjects included in Michigan State's course.

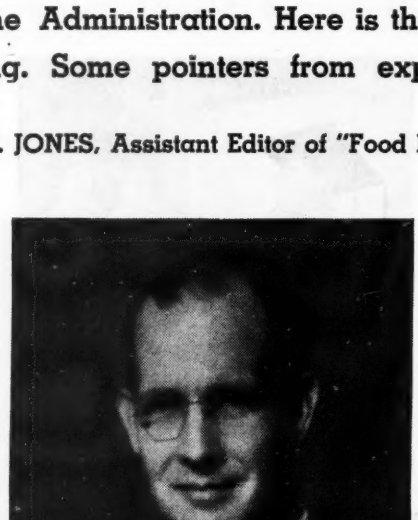
Employment by the Year

So great is the demand for stabilized employment that guaranteed annual wages have been urged by CIO and the Administration. Here is the tipoff to management to get busy with its own planning. Some pointers from experience are presented here

By J. A. J. JONES, Assistant Editor of "Food Industries"

FLUCTUATING employment has caused more of our economic ills than all other factors combined, in the opinion of many business men and economists. And not a few agree that much more can be done to stabilize employment and income —therefore, consumer buying power—if industry buckles down to the task of working out ways and means. Already the job has been done by a few companies—at the cost of some difficult planning, but with the reward of increased dividends. Outstanding among these are two companies in the food industry—Geo. A. Hormel & Co., Austin, Minn., and McCormick & Co., Baltimore, Md. The former has for years successfully operated in the seasonal meat packing business with a guaranteed-wage plan, an extreme among employment stabilization schemes. More will be said about its program subsequently, but to put it into effect required careful planning of production output, predicted a year ahead, as well as a leveling off of production operations by the manufacture of a variety of products that can be fitted into the seasonal valleys of regular packinghouse operations. McCormick has stabilized its employment by a program of assured work for the year, a plan that most business men view with less trepidation than the more rigid guaranteed annual wage.

Other food processors, some with the highly seasonal short-crop operations that make employment stabilization so difficult, are trying to work out a plan where at least a basic working force can be maintained the year 'round. Here the solution to the problem is extremely difficult, but such steps as are economically feasible might well be taken, because probably nothing is more important to the continued success of the free enterprise system and to the economic health of the country and of business as a whole, than greater peacetime regularity in employment and income.



CHARLES P. McCORMICK

But taking industry in its entirety, progress toward stabilized employment has been so slow and the need in the postwar years ahead is considered so great that an extreme means—the guaranteed annual wage—recently has been urged by the C. I. O. and by the Administration. Here is the tipoff to industry that it will serve its own interests, and those of the country, best by taking the initiative and stabilizing employment as best it can by some means which permit it to operate successfully within the limitations of a particular business economy.

As a guide to such planning, let us review the two notable employment stabilization plans which are operating successfully in the food industry—those of Hormel and McCormick.

Guaranteed Wages

Hormel inaugurated its plan of guaranteed annual wages back in 1933. The plan was not compulsory, but almost all the departments had accepted it before the war. Where it was accepted, each employee was given a contract guaranteeing 52 weeks pay for the ensuing year.

How does this plan work? In order to avoid the possible consideration of war induced conditions, let us take the year 1936. Before the time for signing the contracts had arrived, the company collected the most accurate information available on prospective livestock supplies and sales for the year. With this and figures on normal volume as a guide, production for the year was estimated and a budget formulated. In the hog-killing and cutting departments, that year's budget was 1,300,000 animals. In the sausage department it was about 5,000,000 lb. Experience told them what these figures meant in terms of manhours of labor and arithmetic gave them the unit labor costs. This cost the company agreed to pay in 52 weekly installments. Of the company's 56 departments in 1936, straight-time contracts were accepted by 52. These 52 represented about 92 percent of the total working force.

The transition was by no means an easy one. In its experimental stages it was merely a plan to give certain persons a weekly rate and to consider them permanent employees. This was then extended selectively with the idea of bringing in more and more employees until eventually everyone would be working on a straight-time basis. But with both weekly and hourly workers in the same departments, this arrangement came to be looked upon as an unfair speed-up system. The straight-time men were free to go home when their work was done, and thus acted as pace-setters for the rest of the employees, on whom the net effect was lessened weekly earnings. In 1931, the first attempt was made to transfer an entire department to the straight-time basis.

To arrive at the number of men to be maintained in the department, the total manhours for the preceding year was calculated, divided by the number of hours on which the week's pay was to be based. For the sake of caution,

these figures were undertaken on a conservative basis. When first presented, the plan was rejected by the men because it called for only 19 permanent workers, while at the moment there were 26 employed there. But when the usual seasonal layoff brought that gang down to 14 men, the plan was eagerly accepted.

During the next two years the efficiency of the work in that department increased markedly. At the end of the first year operating costs had been reduced 26 percent. A further reduction of 12 percent was affected in the second year.

With the spreading of the plan to other departments an effective bonus plan was put in operation and this, in turn, helped to evolve a joint earnings plan about which the company is justly proud.

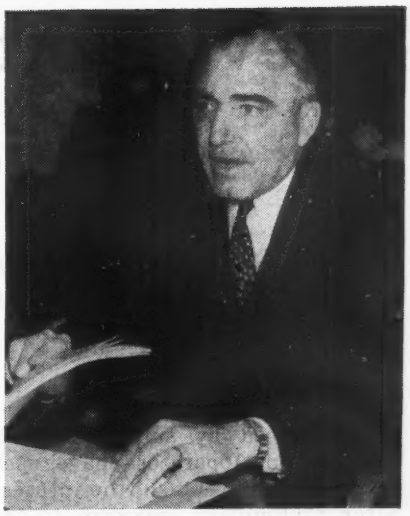
The work and annual pay schedules at Hormel have stood the test of both peacetime and wartime operations. On Nov. 1, 1941, the company had 4,495 employees, 3,973 of these, including those on military leave, were still with the company on Nov. 1, 1943. This is a little more than a 5 percent turnover per year, which the company says is substantially higher than the turnover in the last three prewar years.

The details of how such a plan was made to work are not nearly so important to the food industry, at the moment, as is the fact that employment, at least in many plants, can be leveled off on a yearly basis if management sets out to really do the job. The Hormel management's attitude follows the general thesis expressed by the economist, Wilfred I. King, in 1938. This thesis is to the general effect that industry spends too much time quibbling over cents per hour, while not enough attention is paid to the productivity of the business and the proper division of its fruits.

Assured Employment

Such a thesis is complimentary to the approach McCormick takes to the same problem. C. P. McCormick came to the presidency of the company in 1932, firmly convinced that competition of worker and management within a company was preventing both from reaping the full benefits from the business. Conceiving his job as that of a trusteeship for both employees and management for the ultimate advancement of the company as a whole, he first set out to instill a sense of confidence and trust among the workers toward management. By first arranging a work schedule that would bring year around job security to all those employed and then by paying out to them a fair share of the earnings the employees had helped to create, Mr. McCormick finds himself, 13 years later, as the head of a plant where the area union leaders admit it is hopeless to try to form a union.

Like the Hormel experience, these things were not accomplished overnight. The stabilization program was first approached through a diversification of jobs. The employee works for McCormick and Co., not for the spice department or the tea department or the sales division. While normally a girl may be assigned to packing spices, it is agreed from the beginning that she may be called elsewhere at a moment's notice. The girl's wage continues at her old rate until the new job becomes permanent.



JAY C. HORMEL

In addition, the company maintains on its payroll a great many double- and multiple-skill workers. For example, when a typist or stenographer is needed, the personnel department usually can find one in the production department.

But again, the actual details are not as important as the fact that a work schedule was formulated that gave the company's employees a secure job at an assured and dependable annual wage. There has been no need for a formal guarantee of wages at McCormick. The workers are willing to take management's word for its interest in their welfare because for 13 years that word has been given and more than kept. They have seen the establishment of a bonus system, a trust fund—where the check is deposited in a bank under the individual's name—and a junior board of directors, whose suggestions in company management now number over 2,700, with just eight rejections by the senior board.

The Hormel and McCormick plans have been outlined here because it is generally conceded that industry may not survive as a free enterprise system unless it succeeds in providing for workers a measure of security from hunger and fear. Management should face this new responsibility squarely and seriously and do what it can to develop a plan that will help to stabilize employment and at the same time will be workable from the business man's viewpoint.

These girls are working for McCormick & Co., not the tea packing department, where they happen to be at the moment. At a moment's notice, some or all may be shifted to another department. Most of the company's office force is drawn from the plant in this manner.

New Methods Produce Superior Dehydrated Cut Fruits*

By H. J. PHAFF, G. L. MARSH, E. M. MRAK and C. D. FISHER,†
University of California, at Berkeley, and Dried Fruit Association†

Part II—Apricots—Technics which make possible the dehydration of apricots have been developed. The fruit is blanched, predryed to prevent bleeding, sulphured and dehydrated. Similar methods used for freestone peaches

ALMOST all dried apricots are produced by sun drying, although some operators have used dehydraters to finish the process after preliminary exposure to the sun for about one day. Heretofore, sun exposure could not be avoided because complete drying in a dehydrater yeilded a product which was more or less opaque and of a straw yellow color, instead of being transluscent and deep orange. After several years of laboratory experiments, Mrak, Phaff, Fisher and Mackinney (1943) announced that if subjected to a short steam blanch before sulphuring, apricots could be dried in a dehydrater without sun exposure, and still attain translucency and the deep orange color typical of sun-dried fruit. This led to an industrial experiment in cooperation with the Research and Development Branch of the Quartermaster Corps in the 1944 season. About 600 tons of blanched, dehydrated apricots was produced in several California plants. Certain of the findings of that experiment will be discussed.

Varieties

Only Blenheim (Royal), Tilton and Moorpark varieties are dried extensively. The Blenheim is more desirable than the Tilton because it has a deeper orange color when dried. Likewise, dried Blenheims usually are thicker than Tiltons. The Moorpark is a large apricot, but is grown less commonly than the other two varieties. It has a tendency to ripen unevenly and frequently shows browning near the pit.

Harvesting

The fruit should be picked by hand when firm ripe, and should have no residual green pigment (chlorophyll) in the skin. This is often persistent in the fruit half which receives the smaller amount of direct sunlight. The sun's rays bleach the chlorophyll, both when the fruit is on the tree and while on the trays in the dry yard. If apricots with a greenish cast are blanched and dehydrated, the pigment will persist in the dry product.

Even though the fresh fruit may be evenly colored and in firm ripe condition, the sugar content is quite subject to annual variation. Coupled with this, the drying ratio changes from year to year. In a good year, like 1943, refractometer readings show the soluble solids content of mature fresh apricots to be from about 15 to 19 percent. During a poor season, such as that of 1944, the soluble solids fraction ranged as a rule only from 11 to 15 percent. The Moorpark variety, because of its longer maturation season, is usually somewhat superior in sugar content. Related to the sugar content is the drying ratio.

The overall ratio in good years may be 4.5 to 5.5:1, whereas in 1944 a good deal of the fruit dried down with a ratio of 6:1 or even went as high as 7:1.

Storage

When apricots have a greenish cast over a limited surface area, it is possible to improve the color simply by storing the fruit in lug boxes for a few days in the plant. The maximum permissible storage time depends on the maturity of the fruit. Soft ripe apricots should be handled immediately after arrival at the dehydration plant, while slightly immature fruit can stand from two to four days. To lengthen the relatively short apricot season, some operators have added a week or more by using cold storage for sound firm-ripe fruit. Moldy and moist fruit should never be allowed to go into cold storage.

Cutting

Fruit picked from the tree and held in clean boxes does not require washing. Traces of air-borne dust will be removed by the initial steam condensing on the cold fruit in the blancher. Apricots are dried with the skin attached. The fruit is cut with a sharp knife completely around the suture. Tearing apart a section of the cut surface detracts from the finished appearance and lowers the grade. An average individual will cut about 80 lb. of medium-size fruit per hour. The fruit is deposited by the cutter onto the tray, close together, so that subsequent handling of the tray will not turn over the halves. The latter causes loss of juice and very slow drying, and the cut surface sticks badly to the tray. The load on a full 3x6-ft. tray is about 35 lb. of cut fruit. The average pit loss amounts to about 6 percent by weight.

Cutting expenses are less when continuous cutting lines leading directly into the blancher are used instead of tables. While cutters usually are paid by the box, women at the blancher end of the line should be paid on the hourly basis; at this point the trays are almost full, which slows up the last cutters considerably. It also is inadvisable to let partially filled trays enter the blancher, since this increases the total subsequent handling cost. Fruit showing pit mold or other serious defects should be sorted out before entering the

*A report on a joint research project of the Quartermaster General's Office, U. S. Army and University of California.

blancher. The total percentage of sort-outs depends, of course, on the quality of the fresh fruit, but should not exceed 10 percent.

Blanching

The question to consider is whether to use a cabinet blancher or a continuous tunnel blancher. The conspicuous advantages of a cabinet blancher are its low construction cost and small space requirement, together with the fact that the trays are stacked cold, a great advantage to the workers lifting the trays. Although the cabinet has worked very well for firm fruits like clingstone peaches, which require a relatively long blanch, the much softer apricots with a short blanching time present some difficulties. Before making a decision, however, the following points should be borne in mind:* (1) A cabinet blancher will work satisfactorily only if an efficient steam distribution system is present on the open side of the tray stack, and an abundant steam supply is available. (2) The cabinet should not contain more than two single cars per charge. (3) Bleeding of the fruit is worse in seasons when the sugar content is very high or when mushy-ripe fruit is used.

At present it is our belief that a continuous blancher will work better on apricots, particularly since it is possible to double-deck trays and still obtain good steam penetration to the bottom tray. But a properly built and carefully supervised cabinet blancher may have great promise if operated intelligently.

The blanching time for apricots ranges from about 1½ to 4 minutes in a continuous blancher. The steam temperature should be over 190 deg. F. at a point one-third of the blancher length from the entrance, and around 212 deg. F. two-thirds of the way inside. Blanching time is slightly longer in a cabinet blancher because of slower steam penetration into the tray stack. Conversely, a tray stack emerging from the cabinet blancher holds the heat longer than one which is built up gradually at the end of a conveyor type blancher. The blanching time is longest when the fruit is slightly immature.

Apricots can be tested very easily for heat penetration by cutting the blanched halves in two. The somewhat opaque unblanched area stands out very clearly. Fruit emerging from the continuous blancher should be blanched a little more than two-thirds of the way through. There is then enough heat capacity in the stack so that heat penetration is completed (stack blanching) without making the fruit too mushy.

The fruit should be tested occasionally for completeness of the blanch, as apricots have a strong tendency to undergo enzymatic browning when underblanched. A very rapid loss in vitamin C takes place simultaneously.

Predrying Before Sulphuring

Contrary to expectations, most of these bleeding losses occur in the sulphuring house. This is because sulphuring causes an additional softening of the fruit tissue and requires about three hours.

Bleeding in the sulphuring house can be eliminated by placing the car with freshly blanched fruit, preferably as hot as possible, into the hot end of a parallel-flow tunnel dehydrater. To have a high evaporation rate, the inlet air must be 180 to 190 deg. F., and have a large wet-bulb depression.

The following measurements, obtained with thermocouples during commercial operation in a parallel-air-flow tunnel with 750 linear feet per minute air flow, will serve as an illustration. At the time of the test, the operation consisted of introducing a double car (2 stacks, 3x6-ft. trays, 25 high) into the hot air end of the tunnel at 20-minute intervals. The total tunnel charge consisted of two double cars, so that the drying time was 40 minutes. Data typical of several trials are shown in Fig. 2.

Temperature readings were taken 30 seconds after the car was

*See also section on blanching in part I, Food Industries, February, 1945.

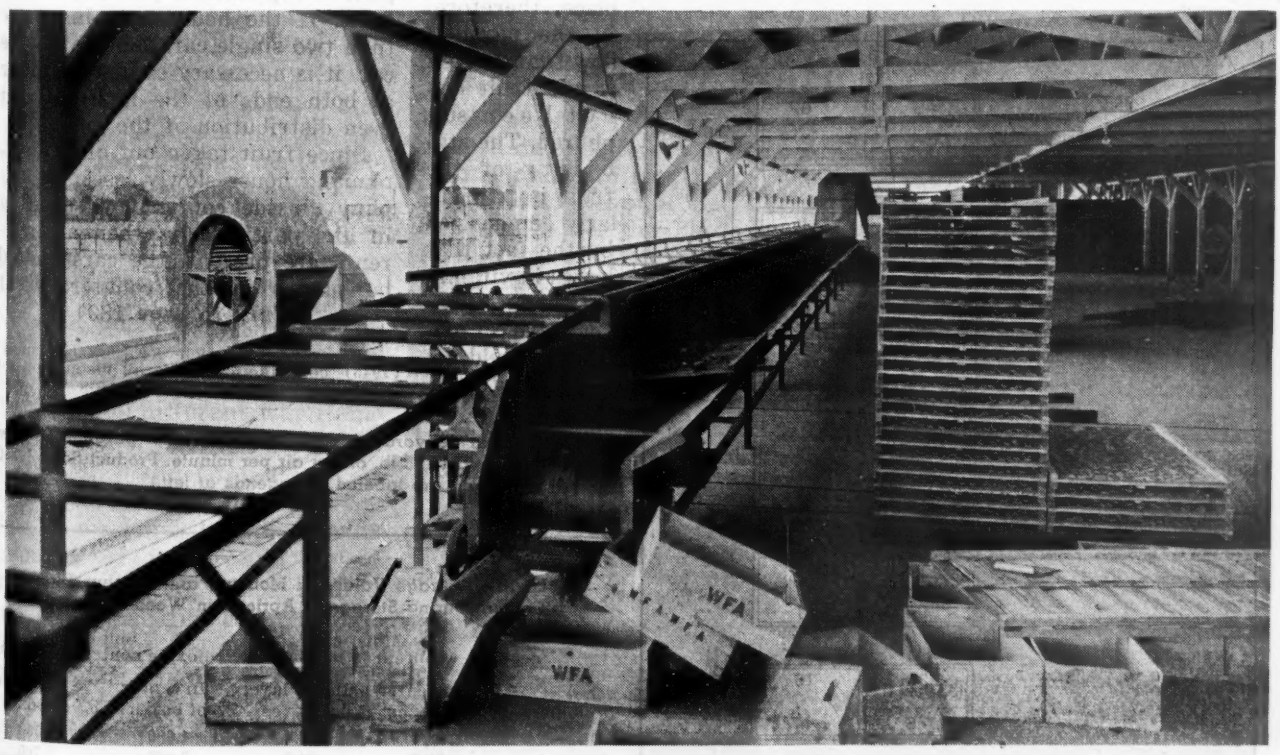


Fig. 1. Continuous line used for scraping and dumping of dried fruit.

introduced into the tunnel, and at 4-minute intervals thereafter. In the figure, the readings obtained are shown with respect to position recorded rather than by the conventional graph.

The temperature drop through the tunnel (across 12 ft. of fruit) decreased from 54 to 46 deg. F. during the 20-minute interval. During this time, the fruit temperature on the upstream side of the tray increased from 110 to 133 deg. F., whereas the fruit temperature on the downstream end of the tray increased from only 111 to 119 deg. F., indicating a somewhat uneven drying across the 6 ft. of fruit. Moisture determinations at the completion of the 40-minute drying cycle actually showed this to be the case. It was found that 20 percent of the original moisture was removed from the fruit exposed to the upstream air and 10 percent from the fruit in the downstream air. An operation designed and based upon cars of single stacks of trays would reduce the uneven drying to a marked extent.

Pounds of water removed per minute is shown to decrease from a total of 15.3 to 12.3 during a 20-minute cycle. A calculation using the average of these values shows the car to lose approximately 280 lb. during its passage through the tunnel. This represents a decrease in the percentage of moisture of from 85 to 82 percent, or the evaporation of approximately 20 percent of the moisture requiring removal.

Considerable inadvertent recirculation occurred during the tests. The tunnels were so situated that a large portion of the exhausted air was drawn into the furnace inlet. Calculations show that the inlet air contained only approximately 60 percent of fresh air. This factor should receive considerable attention in the operation of such a system of predrying.

It will be noted that the temperature drop is very great and only a relatively small number of cars can be present in such a tunnel. In working out a tunnel schedule, the following rules will prove helpful:

(a) Use little or no recirculation. This results in a low wet-bulb temperature and the tunnel can hold more cars without causing the exhaust air to become too humid. (b) Unless the production is very great, one tunnel usually will suffice. In the example given above, the plant used about three tons of whole fruit per hour. (c) At any given time, regulate the number of cars in the dehydrater so that the air temperature at the cool end is still about 15 deg. F. higher than the wet-bulb temperature. (d) If the periodicity is 15 minutes or less, the hot-end air temperature may be as high as 200 deg. F. without danger of scorching.

In addition to its other effects, blanching causes a great increase in drying rate and an inactivation of the enzymes causing browning. No discoloration of the fruit takes place, therefore, in the parallel-flow tunnel, even if the fruit has not been sulphured. The stability of the fruit is particularly emphasized by the fact that losses in vitamin C, which is very sensitive to oxidation, could not be demonstrated.

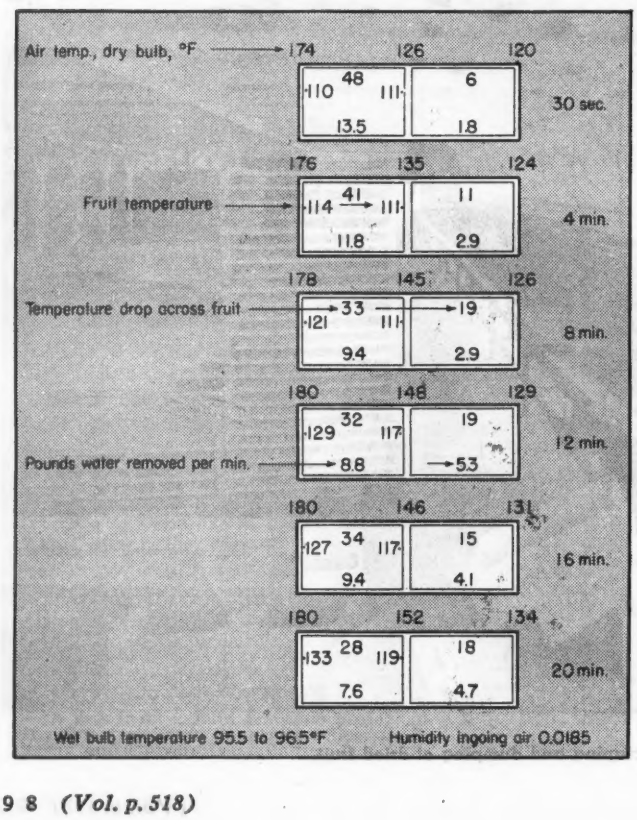


Fig. 2. Typical dehydration data for commercial parallel air-flow tunnel. Air-flow, 1,175 lb. of dry air per minute. Product flow, 1,750 lb. per car. (Data are labeled by legends at left.)

TABLE I—Sulphur Dioxide Absorption and Retention in Apricots during Dehydration.

SO_2 in p.p.m. on the wet basis.

Absorption	Retention	Retention ratio
3,100	4,070	1.31
3,060	3,500	1.15
2,490	3,540	1.42
2,300	3,780	1.64
2,590	3,680	1.42
4,060	5,100	1.26
4,780	5,240	1.10
3,740	4,740	1.27
2,400	4,500	1.87
3,090	4,540	1.47
2,530	4,140	1.64
2,330	3,040	1.30
3,030	3,920	1.30
3,120	4,120	1.32
	Average	1.4

TABLE II—Drying Out of Apricots on Trays After Removal From Dehydrater.

Fresno area, San Joaquin Valley, California

Test	Moisture content in percent after removal from dehydrater	Number of hours exposed on trays	Final moisture content (percent)
1	>30	28	19.0
2	>30	9	23.4
3	>30	5	24.3
4	>30	5	23.0
5	29.5	9	21.6
6	29.0	5	25.9
7	26.5	5	23.8
8	24.4	6	22.5
9	21.5	7	19.8

Sulphuring

When predried fruit is placed in the sulphuring house, it should not be steaming hot but at a temperature of approximately 100 to 110 deg. F. If the product is very hot, sulphur dioxide absorption is low, and the resulting dried fruit is under-sulphured.*

When blanched apricots are to be dehydrated, a minimum sulphuring time of 3 to 3½ hours is recommended, about 9 lb. of sulphur being burned per ton of cut fruit. If the house contains more than two single cars, or one double car, it is necessary to burn sulphur at both ends of the house to get even distribution of the gas.

Since fruit taken out of the sulphuring house slowly loses its sulphur dioxide content by standing in air, particularly when air currents are present, the cars should be placed in the countercurrent

(*Turn to page* 180)

*A previous article (F. I., February, 1945) contained a general discussion of certain principles of sulphuring.

TABLE III—Average Values of Moisture and Sulphur Dioxide Content During Storage of Apricots in Wooden Boxes.

Time	Moisture content in percent: In center of boxes	Moisture content in percent: In top layer of boxes	Sulphur dioxide content in p.p.m.: In center of boxes	Sulphur dioxide content in p.p.m.: In top layer of boxes
0	28.4	28.4	4,090	4,080
30 hours	28.8	24.2	3,460	3,760
3 days	27.5	22.7	3,760	3,670

EDITORIALS

LAURENCE V. BURTON, Editor

Loans vs. Capital For Small Business

MAURY MAVERICK and his committee to render postwar aid to small business have shed crocodile tears that are not wholly impressive. In general, their philosophy seems to imply the need of *loans* to small business rather than *risk capital*. If Mr. Maverick had a previous successful record as a business man, instead of long experience as a politician who has drawn his salary from public funds, his case might be more convincing.

Admittedly, small business often desires to borrow money that it cannot always get. But this is as true of poor people as it is of small business. Any banker of mature years will tell you that the desire, or even the need, for money is no basis for a loan. For loans are expected to be repaid.

What small business often lacks is the management ability that will guarantee to banks or to investors alike that their money is in good hands and will not be dissipated. When any business management is of caliber high enough to attract risk capital as a permanent investment, it usually has no trouble in obtaining banking accommodation.

Paper Supply Critical

NUMBER one among war material shortages is paper. This scarcity stems from the fact that 700,000 different war items are wrapped, packaged, labeled, tagged or made from paper or container board. And when the Pacific war speeds up, terrific amounts of paper and board will be required, since double and triple packing are required for protection against weather, insects and fungus.

People in the food industries can help to minimize the seriousness of this acute paper shortage. Avoid any waste of paper packaging materials. Organize for a continuous drive in your plant and office to collect waste paper of any kind to put into paper salvage. Clean out old paper in stock rooms and files. Scrap dead correspondence, obsolete records, useless display materials and cartons. Also, please share this magazine with your associates. Because of the paper shortage, the number of copies is limited.

Each of us still must do little extra bits to help the war effort. Saving paper is one of those bits.

Conciliation Pays

WHY wait for the fireworks to explode? Wise management pays close attention to employee relations. It adopts a sound broad-gage policy and places the administration of such a policy in the hands of a competent, level-headed, friendly individual. While that is no guarantee of freedom from employee trouble, it is a big step in the right direction. But sometimes, in spite of everything—anyway, it so appears—an impasse is reached and trouble looms. What to do then?

A number of food companies have availed themselves of the help that Conciliation Service of the U. S. Department of Labor can render. This Service is doing a creditable job in a friendly, voluntary and impartial manner. Its operations are of considerable magnitude. During the twelve months ending June 30, 1944, the Service satisfactorily handled over 2,000 disputes involving over three-quarters of a million workers in the food industries alone.

Relying entirely upon the voluntary method of handling cases, the Conciliation Service helps to settle disputes around a conference table in an informal atmosphere. The conciliators are well chosen for the job and enjoy the respect of both employees and management for their friendly and open-minded attitude. It might be helpful here to list the regional directors of the conciliation service. They are:

H. Ross Colwell, Parcel Post Bldg., 341 9th Ave., New York; Clarence Williams, 10 Forsyth Street Bldg., Atlanta; William F. White, 222 West Adams St., Room 375, Chicago 6; Edward J. Cunningham, 258 Federal Bldg., Cleveland 14; E. R. Marsh, Phelan Bldg., Room 533, 760 Market St., San Francisco 2.

Here is hoping you will not have occasion to use the Service, but if you do, it is at your call.

Help Wanted: Urgent

Food chemists, food technologists or food engineers with experience in any phase of food processing, and who are now in the military forces in either the European or Mediterranean Theater of Operations, are needed for important work for the Army. If any such men of your acquaintance, or from your company, are now in Europe, please notify us at once, giving:

Name .....
Specialty .....
Where formerly employed.....
.....
Present military address:
Rank .....
Number .....
Organization .....
A.P.O. number.....
c/o Postmaster, New York

Don't delay. The need is urgent. Write to the Editor of FOOD INDUSTRIES, 330 West 42nd St., New York 18, N. Y.

Possibility of More Tin

IF the current pilot-plant tests of a new method of making tin concentrates from low-grade ore turn out successfully there is a much brighter prospect for more tin at an early date.

Low-grade ores from South America have to be "sweetened" with high-grade concentrates from Malaya before smelting in order to obtain a metal of requisite purity under current conditions. We still have left in Texas some of the high-grade

Malayan tin concentrates. High-grade ore deposits in South America are owned in Britain and the concentrates are shipped overseas for smelting. Under the new process (if successful) the concentrates will be shipped to the smelter in Texas. They will not need the sweetening, and as there appears to be plenty of ore available, the prospect is good for additional quantities of pure tin in the United States.

This will be a matter of considerable relief for the canners. Apparently all that is needed is proof that the new process is a success.

What Is Best Way To Cool Powders?

THE problem of cooling warm hygroscopic foods in powdered form is one of the problems of food engineering that needs further study. The food technologist finds that the powder must be cooled to the required temperature, but it is up to the food engineer to perform the job in the best manner and at the lowest cost. If you want to start a debate, there is no likelier subject than how to cool powders—which means that there is no exact knowledge available on the subject today.

Various methods have been proposed, some of which are said to be very successful. One proposal is to transfer the powder through a small bulk-flow conveyor, like the "Redler" or the "Bulk-Flo," equipped with a cooling jacket. But objection is taken to this method on the ground that the surface of the powder mass in contact with the cool metal will be reduced below the dew point of the warm powder in the center, and will actually become dampened as a result.

Another proposal is to move the warm powder on an enclosed vibratory conveyor with cold air blowing through it.

Still another proposed method is to sift the warm powder into an upward stream of cool air, the air being recirculated through an outside refrigerating coil. Powder would be drawn off at the bottom and the fines that blow out recaptured in a cyclone separator.

A fourth proposal, said to be in actual use, is to draw the powder into a suction conveyor where a high vacuum is maintained. Expansion of the air in the powder furnishes the force which moves the powder, while evaporation of some of the residual moisture in the powder removes sufficient heat to cool the mass. Objection to this method might be found where the moisture content is very low, say 2 percent, or where the powder is very hygroscopic.

Whatever method is the appropriate one, there arises a need for a well-engineered job. Design and construction must be such that it performs its job properly without waste of equipment, materials of construction, operating power, refrigeration or labor.

There is need for such equipment today. Are there suitable designs available?

Research Needed On Electronic Heating

Many in the food processing industries have become excited about the possibilities of electronic heating. What follows here is by way of an observation which we hope will pull electronic heating out of the stratosphere and bring it down to earth in the minds of food processors.

Not once, but many times, we have heard this statement from representatives of manufacturers of electronic heating equipment: "Electronic heat is the most expensive type of heat available." These men, whose livelihood depends upon the sale of electronic equipment, did not go around making wild statements to scare business away from their employers. Rather, they are very anxious to keep people from thinking that you can do anything and everything the electronic way, and then being disappointed. They freely admit, however, that the future holds all sorts of possibilities. So somebody ought to spend some money for electronic heating equipment and do a little research work with a view to opening up economic uses in the food processing industries.

There are two types of electronic heating—induction and dielectric. The latter is used with nonmetals, and hence is the type applicable to food processing. It heats the product uniformly by setting up electrostatic stress in the molecular structure. That is, the high-frequency electrostatic field, alternating as it does, stresses the molecules first one way then the other millions of times a second, this stress generating heat in the product.

What It Costs

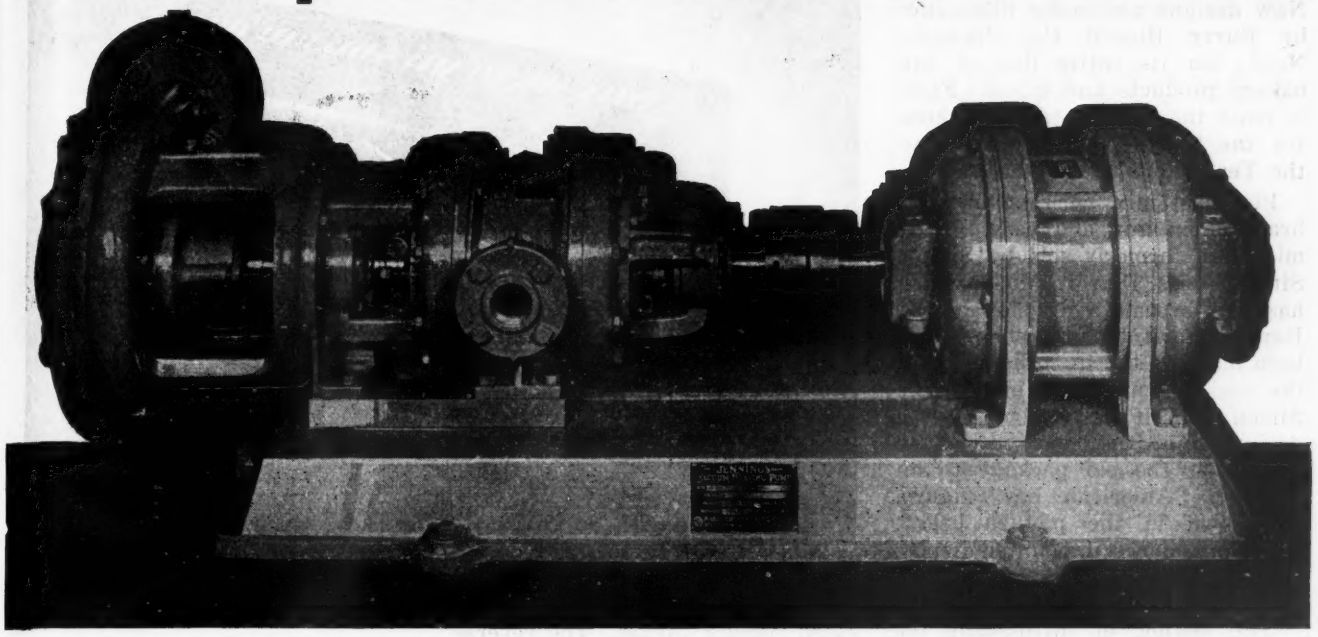
These data, from an electronic heating expert, will give you some conception of the economics. To evaporate one pound of water a minute by dielectric heat would require a 20-kw. unit. This unit would cost about $10,000 and the energy to operate it would come at 2½ to 3 cents per kilowatt-hour.

So far all of the successful commercial applications of electronic heating have been special ones where quality is the big factor or where the job could be done in no other way. It may well be that the quality angle will justify the cost in some food processes. And research should be undertaken to find out what happens to the flavor and bacterial content of food heated electronically. Is it possible, for example, that pasteurization could be accomplished in the high-frequency field at a lower temperature than with other heat sources?

To date the manufacturers of electronic equipment have been too busy on war work to do much in that direction. Which at the moment leaves it up to the food processors to make tests in the interest of better quality.

It may be impossible to buy an electronic heater right away, but it is not too early to place an order to be in line when war production cutbacks come.

Nash—the Perfected Vacuum Pump for Evaporators and Condensers

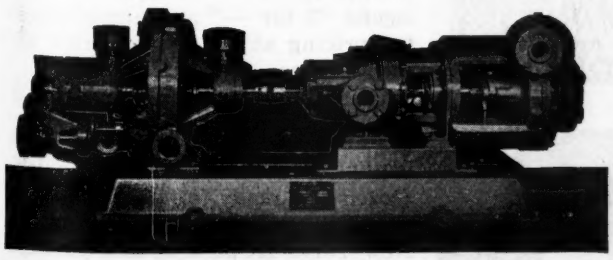


COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.



THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

SOUTH NORWALK · CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

New Labels

NEW designs are under discussion by Burry Biscuit Co., Newark, N. J., for its entire line of fine bakery products and mixes. First to reach the market stage are those for the Simple Simon mixes and the Year 'Round Fruit Cake.

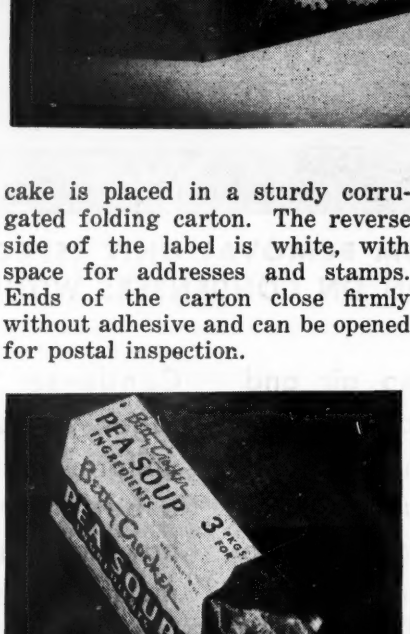
Pie crust mix, corn muffin mix, bran muffin mix and easy biscuit mix were formerly sold by Simple Simon Foods, Detroit, Mich., which has now become a division of the Burry Biscuit Co. No change has been made in the ingredients or in the package materials, but Simple Simon himself has evolved in the design from the conventionalized puppet of the old package to an amusing "American boy" figure, as shown in the picture below. First introduced in counter display cards, the new character has now moved over to the packages.

The method of introducing the new labels is particularly interesting. Simple Simon will be used on counter cards for all Burry products, although most of the labels will remain unchanged at present. In this way the advantages of family resemblance will be extended to all the packages, while actual label changes can be allowed to wait on supplies and equipment.

Labels for the cake packages are to be redesigned to give a feeling of simplicity and dignity.

The Year 'Round fruit cake has a purple diamond-shaped panel against a very unusual black background, with a leaf or flower design in each corner to represent the four seasons.

This is a ready-to-mail package. The cake is set in a red waxed paper cup with fluted corners. A cellophane wrapping is heat sealed over this. Then the moisture-protected cake is placed in a sturdy corrugated folding carton. The reverse side of the label is white, with space for addresses and stamps. Ends of the carton close firmly without adhesive and can be opened for postal inspection.



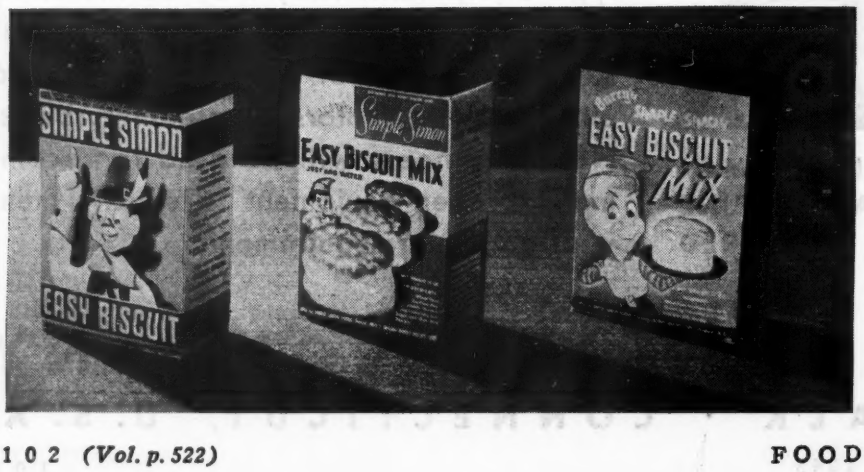
Green Pea Soup

GREEN split peas, recognizable as such in the final product, distinguish Betty Crocker Pea Soup Ingredients from other dehydrated pea soups.

General Mills, Inc., Minneapolis, Minn., combines the green split peas with dehydrated onion, vegetable protein derivative, salt, soda, spices and an artificial flavoring. Uniformity in the mix is assured by extruding it in cylinders which are about 1/16 in. in diameter and up to ½ in. long after drying.

The 4-oz. package makes 4 to 6 servings, by boiling in 3 cups of water or milk for 2 minutes.

Green, red, yellow and white are used in printing the distinctive bag-in-box package. Chain store marketing is indicated by the legend "3 for —" and ample space for pricing at the upper corner of the package.



Ready-to-heat Plates

WHOLE MEALS, pre-cooked, quick frozen and ready to finish cook, are supplied by Maxson Food Systems, New York. At present they go only to the air transport units of the armed forces, but eventually they will reach the retail outlets.

Meat, potatoes and vegetables are pre-cooked to the exact state where 15 minutes in the oven will finish the cooking. They are put in separate compartments of a plastic-sprayed fiber plate. A sheet of parchment and a light cardboard

cover are put in place to be held by a plastic ring. The whole is quick frozen.

To serve, the plate, with covering removed, goes into a special electric heating unit. Fifteen minutes later it is fresh cooked and ready to serve. An arrangement of baffles prevents desiccation of the vegetables while permitting direct radiant heating of the meat component.

The menus can be varied as desired. At present they include such combinations as broiled ham, lima beans and candied sweet potatoes; steak, peas and french fries; frankfurters and beans; and beef stew with vegetables.

Fortunate travelers on Naval Air Transport planes have been eating these meals, with hot coffee and a quick frozen dessert, for several months. Crews of lighter-than-air craft are to be supplied with them soon. Housewives eventually will be able to enjoy the advantages of individual menus with no waste, bought in packages that include plates which go from the oven to the table, with no subsequent dish washing.

To Bake at Home

PIES with a professional puff-pastry type crust and a home filling can be made without the muss and bother of mixing and rolling. Gretchen Grant's Pre-paired Top and Bottom Pie Crust is made ready to bake, with both crusts rolled to the proper size for a 9-in. pie pan. Then each crust is encased in a separate cellophane envelope, clearly labeled, and the whole is quick-frozen.

To use, it is only necessary to remove the crusts from the freezer, allow them to come to room temperature (about 45 minutes) and put them in the pie plate with any desired filling. Baking directions are the same as for any other pie.

At present the two crusts, in their envelopes, are wrapped in heat-sealed cellophane, with a small identifying label showing through.

The product is being distributed by S. Joseph Downing, 121 East 31st St., New York 16, N. Y.

Flavorful Nutrition

APRICOT-PAPAYA Spread is among the many new products of American Dietaids Co., Inc., Yonkers, N. Y.

Ingredients are listed as apricots, papaya, brown sugar and honey. The smooth amber-colored spread

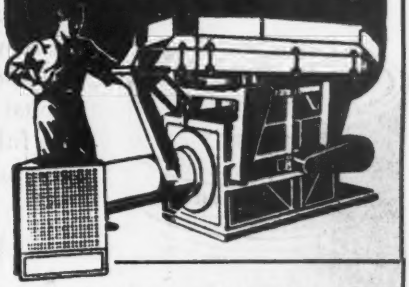
is packed in glass jars containing 1 lb. The metal screw cap, with a flowed-in top seal gasket, is white.

Nutrician Brand labels are in green and white, with a white panel on which the name of the product is featured in red. A small two-color insert suggests a use for the product, in this case as a spread on crackers.

Take the $ $ $ $ $ $ $ out of $tone$

• Now, with critical war shortage of labor, streamline STONING in your mill. Removing stones has always been slow, laborious and costly out of proportion to other steps in processing cereals, soy beans, and other dry foods. To eliminate this great headache of the cereal and other dry food processors, we have developed a new type stoner—revolutionary in design, amazing in efficiency, low in first cost, in operation. Removes stones, glass, non-magnetic metals, and all other hard, dangerous contaminations from cereals, soybeans, and other beans, and other food products with, 1) an action so sensitive the tiniest particles are easily removed; and 2) operating cost so low it is relatively insignificant; and 3) 99.9% efficiency. Capacity up to 16 tons per hour. *Write for Bulletin FI-545.*

SS&S
AIR-FLOAT
STONER



SUTTON, STEELE & STEELE, INC
DALLAS, TEXAS
In Canada—Kip Kelly, Ltd., 68 Higgins Ave., Winnipeg
Foreign—Separations Engineering, Ltd., 133 Bush House, Aldwych, London

Anopheles punctulatus
malaria-carrying mosquito

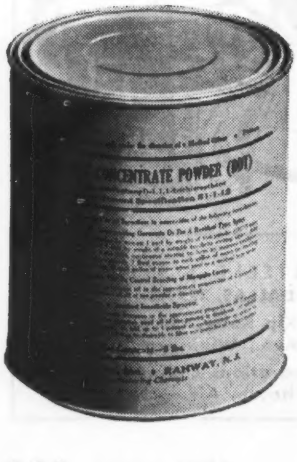
Pediculus humanus (female)
typhus-bearing louse

Crown Cans

guard conqueror of disease-bearing pests!

IN the development of DDT, destroyer of the malaria-carrying mosquito and the typhus-bearing louse, scientists see a day when the earth will be forever rid of two scourges that have recurrently decimated populations since time immemorial.

Merck & Co., Inc., of Rahway, N. J., who manufacture it for the U. S. Navy, take the precaution to package this new wonder insecticide in Crown cans. For, despite the rigors of many handlings and widely varying climatic conditions incident to the thousands of miles this vital chemical must travel, Crown cans assure its complete protection . . . the retention of full strength . . . thus preserving the lethal qualities of DDT ready for lifesaving service in pestilence-endangered areas throughout the world.



★ ★ CROWN CAN ★ ★

INDEPENDENT AND HELPFUL

CROWN CAN COMPANY • NEW YORK • PHILADELPHIA
Division of Crown Cork and Seal Company, Baltimore, Maryland

FOOD INDUSTRY NEWS

DEVELOPMENTS IN DISTRIBUTION

Congressional Food Inquiry Gets Down to Causes of Meat Shortage

Packers and feeders claim price manipulations to blame for premature cattle marketing and black market activities

THE Senate's inquiry into the causes for the domestic food shortage gave the meat industry an opportunity to raise its voice against the squeeze into which it claims it has been thrust by OPA's pricing policies. In early 1944 hog raisers were encouraged to increase production and a floor price of $13.75 per cwt. was assured by government officials. Suddenly, alarmed at the prospect of a pork surplus, the support price was reduced to $12.50. With feed supplies short, farmers cut hog production by 29 percent from the 1943 level. As pork dwindled, demand switched to beef and rapidly exceeded the supply.

The number of cattle had been mounting until a ceiling price of $18 per cwt. was placed on live cattle sold for beef. And this ceiling was reduced later to $17.50. Cattle feeders abandoned feed lot operations in wholesale numbers, dumped the livestock on the market, in fear of continuing feeding operations in the face of increased feed costs and a further reduction in price. Thus, millions of pounds of beef, which would have been distributed among individual animals in normal weight building operations, never materialized.

The packer's representatives also pointed to the losses they are required to sustain on many operations, which OPA ignores as long as overall operations show a profit. These losses, it was declared, can be absorbed by the big packers with their diversified operations, but they leave the smaller operators with nowhere to turn except to black market diversions.

The Senatorial members of the investigating committee strongly criticized OPA for its failure to control the black market and for its failure to extend relief to packers caught in the price squeeze. This criticism was especially sharp after testimony revealed that OPA was hoping to reduce the 80-cent subsidy to nonprocessing slaughterers in face of the industry claims that the 80 cents was inadequate. The enormous increase in licensed slaughterers also came in for a share of the blame in black market operations. Before 1942, according to the testimony, there were about 2,000 licensed slaughterers in operation. Since then WFA has issued licenses to more than 25,000 small slaughterers.

New Regulations

As a result of the Senate hearing and a similar investigation by a House committee, OPA announced an increase from $12.50 to $13 in the hog support price, effective April 1, and to continue to Sept. 1, 1946. A four-point program, to broaden Federal control of slaughters, was also proposed by Rep. Clinton P. Anderson, chairman of the House committee, as the first of the public hearings, to be held in a half dozen major cities, got under way in Chicago.

There followed a ten-point program, issued by the Office of Economic Stabilization, which embraced the House committee's objectives. This program gave rise to OPA's Control Order 1.

The OPA order recognized the fact that set-asides for military demands are being met exclusively by Federally inspected slaughterers, and that virtually no noninspected meat crosses state lines. The order, which went into effect April 30, requires the establishment of percentage quotas for all noninspected slaughterers. Through the order, it is hoped to drive more meat into Federally inspected plants and thus provide a more equitable distribution of meat in the urban areas, particularly East Coast cities, which depend heavily upon meat brought across state lines.

Another purpose of the order is to wipe out the black market in meat by denying quotas to those who do not comply with OPA regulations.

WFA Renews Guarantee For Canners' Products

THE War Food Administration issued a formal announcement on March 26 of a guaranty purchase plan to protect canners of fruits and vegetables against loss in an all-out program to meet increased requirements for these processed

Harris-Ewing

WHY A MEAT SHORTAGE?

The Senate inquiry into the Nation's food shortage brought forth extensive testimony on the price squeeze in which packers, slaughterers and feeders were plunged by the government's activities in price manipulations. The widespread causes and rapid development of black markets also came in for an airing. In this picture, Wilbur LaRoe, Jr., general counsel of the National Independent Meat Packers Association, is seated at the left. Following Mr. LaRoe, in the usual order around the table, are Senators Burton K. Wheeler, Montana, Elmer Thomas, Oklahoma, and George D. Aiken, Vermont.

foods in 1945. The execution of this program depends on future legislative action and availability of funds.

The announcement reaffirms a program outlined by WFA at a meeting of canners in Washington, February 5, when they were told that increased Government needs, principally for the armed forces, plus U. S. civilian requirements, would necessitate production at the highest possible level this year.

Government requirements for 28 major canned fruits and vegetables in 1945 will total 128,700,000 cases —4,700,000 cases in excess of overall requirements last year. For vegetables the 1945 requirement is 93,400,000 cases, and for fruits it is 35,300,000 cases.

Procurement of these canned foods for Government use is assured through operation of War Food Orders 22.8 and 22.9, which require canners to set aside, for sale to Government agencies, varying percentages of their 1945 packs, based on average production in 1943 and 1944. WFA's guaranty purchase program protects canners in two ways:

1. It guarantees the purchase, from any packer, of fruits and vegetables set aside by him under WFO's 22.8 and 22.9 (up to 90 percent of the quantities set aside) in the event they are not purchased by the Army Quartermaster Corps.

2. It commits WFA to the purchase of additional quantities of canned peas, snap beans, sweet corn, tomatoes and tomato juice packed in 1945 (except snap beans, where the period is May 1, 1945, through February 28, 1946) in order to carry out grower support price commitments on these commodities for canning purposes.

Soya Product Is Oleo Then Again It Isn't

THE Food & Drug Administration holds that the soya butter in which W. G. Barnard, operator of Natural Foods Institute, Cleveland, had developed a thriving trade among hotels, restaurants and housewives, is not oleomargarine and that so to label it would be misbranding, inviting penalties. But the Bureau of Internal Revenue, by its own methods of testing butter substitutes, ruled that soya butter was oleomargarine, that Barnard must have a $480 wholesalers' license, a $48 retail license, and collect 10c a pint tax from consumers of the soya protein, soya milk, carrot oil product. A third agency, the Ohio Department of Agriculture, has served a warrant on Barnard, charging him with mislabeling his soya butter, under a statute prohibiting the sales of colored oleomargarine.

Barnard sought an agreement with the various agencies to maintain status quo pending judicial classification of the soya butter. Refused, he sought a Federal Court injunction against imposition of the tax. The Northern Ohio District Court ruled that soya butter need not be labeled oleomargarine, but that the tax should be paid, subject to recovery if it eventually turned out not to be oleomargarine. Barnard pointed out that no means existed to distribute the 10c a pint tax that would be collected on the 5,000 pints he was selling weekly, and stopped the sale entirely.

The hoped-for decisive court case has been pending for 14 months in Michigan, where the Internal Revenue Bureau sued the manufacturer of soya butter for taxes on oleomargarine, with sales permitted to continue pending the ultimate ruling.

Thus while Ohioans are denied it, Detroiters may buy the low ration point fat concocted by H. O. Butler, in the Little Seventh Day Adventist hamlet of Cedar Lake, Mich. The Butler Food Products Co. is the sole maker, and the Cleveland market is estimated to have taken a tenth of his output. Sales originally were confined to those with religious or dietary scruples against animal products. The butter shortage boomed consumption by hospitals and other institutions and housewives.

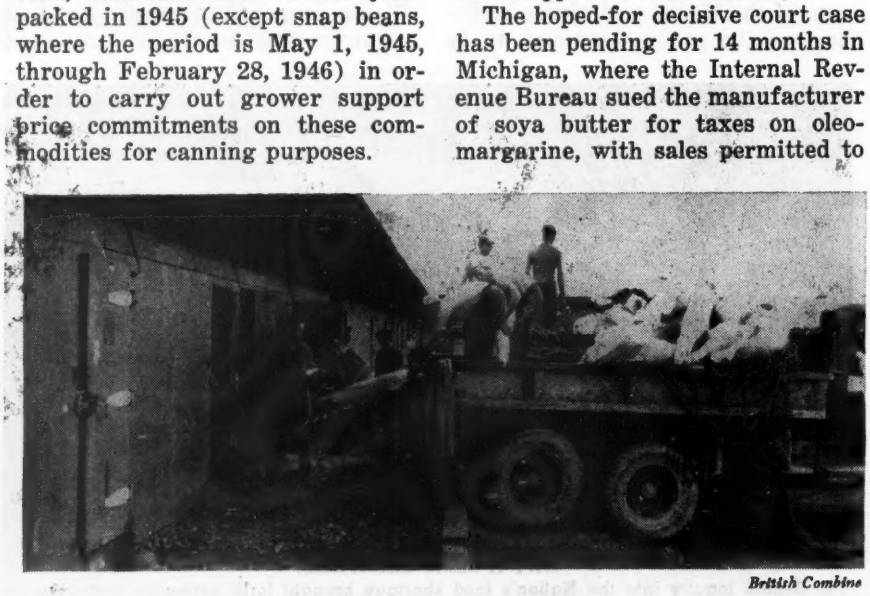
Vitamin reinforcement of the soya product with carrot oil gives it a rich yellow color, which the manufacturer, who had applied for patents, contends does not constitute artificial coloring.

Barnard called a mass meeting of Cleveland burghers to demand a "fifth freedom—to eat what we choose." Some 5,000 signed petitions for remedial legislation. On the same day, however, the rural dominated Ohio Legislature killed a measure to remove restrictions on oleomargarine.

Barnard's life is further complicated by a dispute with the Better Business Bureau over his advertising of meat-like products of soya protein, which hotels and restaurants, as well as individuals, are buying as substitutes during the meat shortage. The bureau objects to his featuring the word "meat," which, it contends, means flesh to the public.

Barnard retorts with a quotation from Genesis 1:29, "And God said, Behold I have given you every herb bearing seed . . . to you it shall be for meat."

So far the advertising media have gone along with his precedent.



British Combine

NAVY'S PACIFIC REFRIGERATOR

Designed and built to store enormous amounts of meat, dairy products and other foods, the Navy's huge cold storage plant in the Admiralty Islands is known as the icebox of the Southwest Pacific. With the dock only 300 yards away, transfer of foodstuffs from ship to lockers is often accomplished in less than an hour. Here a GI is checking sides of meat as they slide down rollers into one of the 264 "reefers."

Food Subsidies

ESTIMATES of the amount of money Uncle Sam spent in keeping down the consumer price of foods last year indicate the magnitude of that price control operation. The following figures in millions of dollars, only partly official, show what the taxpayer contributes, to make the market basket price less than otherwise, on some of the major subsidized foods or food raw materials:

Livestock $659.9, Butter $117.0, Flour $80.1, Fluid Milk $350.0, Raisins and prunes $18.9, Canned vegetables $20.0, Cheese $18.0. The total comes to $1,263.9.

"When we first bought this Stainless Steel equipment we worried a bit about its cost —but not any more!

"Certainly, Stainless Steel costs more to buy. But it also costs a lot less to use. Why? Simply because it offers lasting, money-saving benefits that no other material can match."

IN answer to a questionnaire recently sent to a large number of dairies, asking: "If you were to buy new equipment today, would you prefer to have it of Stainless Steel?", as high as 83% voted "YES."

The favored place that Stainless Steel equipment has earned for itself in the food processing industry is due primarily to the fact that it so consistently pays off—in better results, less maintenance and longer life.

Remember, the first cost of U·S·S Stainless Steel equipment is its last cost. Solid metal throughout, its goodness is not just skin deep, but goes through and through, cannot wear off. Its high strength, superior resistance to wear and corrosion make it virtually everlasting.

The dense, smooth surface of U·S·S Stainless, which gives bacteria no permanent toe-hold, is *easily* kept bright and clean. Over the long life of Stainless Steel equipment, the savings in cleaning time, labor and materials run into totals that alone are sufficient to show a profit on the investment in stainless.

Equally important in quickly amortizing the extra cost of U·S·S Stainless Steel is the fact that the higher degree of sanitation possible by its use assures complete freedom of spoilage losses caused by metallic contamination, discoloration or change of flavor.

If your after-the-war requirements are under consideration you'll find our book, "U·S·S Stainless Steel in the Food Handling and Processing Industry," a trustworthy guide to efficient and profitable operation.

U·S·S STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

USS STAINLESS STEEL — UNITED STATES STEEL

UNITED STATES STEEL

This little package went to market

This shopper quickly took it home!

Most women associate a smartly-tailored appearance with quality. That's why this expertly-fashioned eye-catcher didn't spend much time on the dealer's shelf. An appealing package *always* has a tremendous sales advantage.

Many manufacturers are convinced that a good package will be an even greater asset in the postwar market—because as rationing regulations are relaxed, shoppers will be more discriminating than ever. Far-sighted executives are making their plans accordingly. A number of them have already placed orders with us for new machines—machines which will feature the very latest innovations in the field of packaging.

Over thirty years' experience in solving difficult wrapping problems has provided us with the knowledge and skill needed to assist you in choosing the *best* machine for your purpose. And if we cannot adapt one of our *80 standard models* to your requirements, then our designers will get busy at their drafting boards. One of the chief reasons for the continued growth of the Package Machinery Company is its ability to *serve the varying needs of individual customers.*

Consult us in the early stages of your packaging plans. Our suggestions may lead to better packages and lower costs.

Write for our booklet "Sales Winning Packages"

PACKAGE MACHINERY COMPANY
Springfield 7, Massachusetts
30 Church St., New York 7 • 111 W. Washington St., Chicago 2
101 W. Prospect Ave., Cleveland 15 • 443 S. San Pedro St., Los Angeles 13
32 Front St., W., Toronto 1

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

Tinplate Assured for Canning Vegetables

CALLING attention to the vital importance of canned vegetables in meeting military and other war food requirements, the War Food Administration has assured growers and processors that full arrangements have been made for supplies of tinplate needed to pack the crops called for in the food production goals.

The canning vegetable acreage goals for this year aggregate 5 percent larger than last year and 46 percent larger than the 1935-39 average acreage. Compared with last year the acreage goals are up 10 percent for tomatoes, 5 percent for sweet corn and 8 percent for green peas; they are nearly as large for snap beans. The Government set-aside of major canned vegetables, this year, is as follows (percentage based on average annual production in 1943 and 1944): tomatoes, 66 percent; corn, 39 percent; green peas, 40 percent; snap beans, 52 percent.

The set-aside figures, officials said, indicate the direct war needs and illustrate the importance of producing and canning large supplies of vegetables this year. The use of cans for non-food items and certain non-seasonal foods will be curtailed because of the current steel shortage, but there will be enough for all seasonal crops and other perishable food required in the war food program. Under Order M-81, the uses of tinplate are controlled, and it is through this authority that supplies for canning vegetables and other perishable foods can be assured at this time.

Colored Milk Bottles Will Preserve Vitamins

PREDICTING that future milk bottles will be of colored glass, to prevent the dissipation of riboflavin, Dr. Thomas Scott Sutton, professor of animal husbandry at Ohio State University, Columbus, told members of the Columbus Milk Council that progress will also be made in retaining vitamin C in milk.

He said that riboflavin is dissipated at the rate of 50 percent for the first two hours that milk is exposed to sunlight, and 80 percent in the first six hours. With a brown-colored bottle, riboflavin dissipation is slowed to a rate of 10 percent for a corresponding six-hour period.

"Dairy cows produce as much

If you've been coasting in a seller's market

★War-born shortages have conditioned the consuming public to an acceptance of almost anything available, no matter how it's presented. But if merchandising history can be trusted, the pendulum will swing to the opposite extreme—buyers will be critical when an abundance of everything is again on the market; quality, appearance and convenience will again be the governing factors in sales.

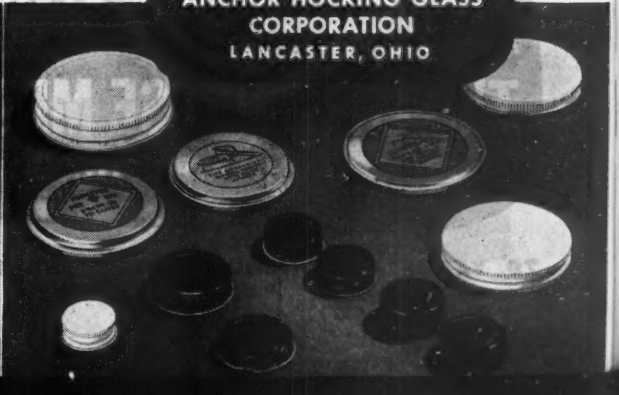
Why not plan now to improve your postwar sales position with Anchorglass packaging! In Anchorglass, the quality and color of your product will speak for itself. In Anchorglass, the eye- and buy-appeal of your product is far ahead of products that are "hidden" by other methods of packaging. In Anchorglass packages all the original flavor, taste or other qualities are preserved intact until the last bit is used.

There's a combination of light, strong Anchorglass container and matched Anchor Cap that will fit your product and production requirements perfectly. Let us show you now how to lead the field with the kind of packaging your postwar customers will want!

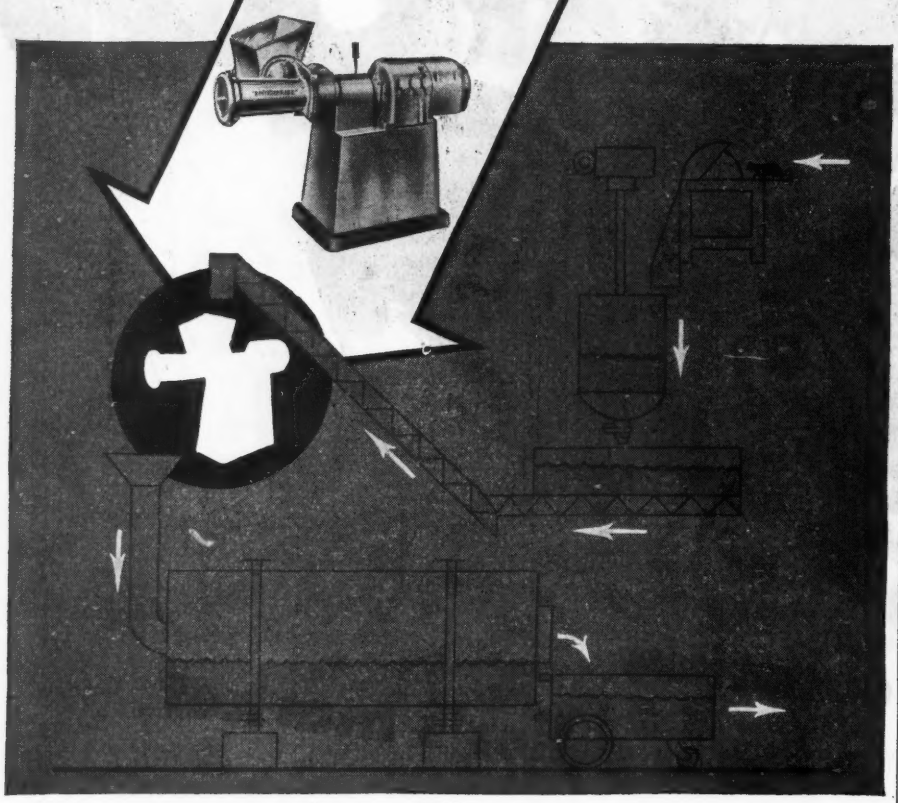
Hear how Anchor Hocking is educating millions of your customers and retailers every week to the advantages of modern glass packaging—"Meet Corliss Archer" every Thursday evening, entire Coast-to-Coast Network, CBS.

Anchor
CONTAINERS and CAPS

PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
LANCASTER, OHIO



DEHYDRATING MEAT?
Put an "ENTERPRISE" RIGHT THERE!



Dehydrated food can't be of higher quality than the original raw material. But you can protect that quality with an Enterprise Chopper. For—whether it's meat, vegetables, fruits or nuts, an Enterprise cuts it clean; no mashing or squeezing to cause loss of juice and flavor.

Into the Enterprise Chopper is engineered an exclusive System of Cutting—all parts teaming up to produce a better product at a lower cost. It's a "natural" for fast-production lines turning out a quality food. It pays its way with processors of every kind—from bakers to packers, from canners to confectioners.

Let us know your specific problem. 79 years of food-reducing experience will be back of any suggestions we're able to make. No obligation, of course, on your part.

The ENTERPRISE System of Cutting

It's exclusive! *It's superior!*

The ENTERPRISE MFG. CO. of PA.

PHILADELPHIA 33, PA.

79 YEARS' EXPERIENCE BEHIND THE MODERN "ENTERPRISE"

vitamin C in this country as is produced in citrus fruits," he declared. "However, this is largely dissipated before it reaches the consumer because of the milk's contact with air, which breaks down vitamin C. Deareating the milk will prevent this. If air is thus exhausted from the milk, vitamin C will be retained."

Flour Mix Processors Have Ceilings Raised

THE Office of Price Administration recently employed an infrequently used method to enable processors of prepared flour mixes to obtain individual increases in their ceiling prices. The new procedure eliminates the requirement that current overall earnings must be less than peacetime earnings in a comparable period. Two limitations were placed on the processors:

1. The processors' adjusted ceiling price cannot exceed the factory-door costs of the product, if the applicant shows any profit on his flour mix department during his latest 12-month accounting period. Factory-door costs include direct costs plus factory overhead.

2. If flour mixes are being sold at a loss, the processors' adjusted ceiling price cannot exceed the total costs of the product. Total costs are obtained by adding to processing costs the general administrative and selling costs, OPA said.

WFA Policy

BASIC policy of the War Food Administration, according to high officials of that organization, is to eliminate food orders as rapidly as possible. Moves in this direction, however, will not be made as promptly as the War Production Board will act following the end of hostilities in the Pacific. War Food Administration points out that the relaxation of food orders will depend upon things other than the end of the shooting.

Cheddar Set-Aside

WFA has announced that manufacturers of Cheddar cheese must set aside for Government purchase 65 percent of their production during May. The set-aside quota for April was 50 percent.

WFA officials stated that military and other Government requirements for Cheddar cheese are increasing and indicated that the June set-aside quota might be as high as, if not higher than, the quota for May.

Good Advice . .

for all of us . . at times.

But we have never talked even half enough about the satisfaction you will enjoy by specifying

KVP

FOOD PROTECTION PAPERS

KALAMAZOO VEGETABLE PARCHMENT COMPANY

PARCHMENT • KALAMAZOO 99 • MICHIGAN

PROTECTIVE Sanitary Fittings

Rapid transportation of HIGH-QUALITY MILK from the dairy farms to milk handling and processing plants has made enormous progress in the last 25 years.

HIGH-QUALITY is all important, both in market milk and in all milk products. Milk's HIGH-QUALITY must be protected—all the way from cow to consumer. That's why America's leading dairy firms have invested millions of dollars in modern high-speed milk transportation units—many of which are equipped with TRI-CLOVER Approved Truck Tank Valves.

HIGH-QUALITY protection is also assured, at both ends of the haul, when the milk is handled with TRI-CLOVER Sanitary Fittings and Valves—made by an organization with 25 years experience in high-quality workmanship.

When you specify "TRI-CLOVER"—in ordering either Trialloy or Stainless Steel Sanitary Fittings and Valves—your milk and milk products are certain to have HIGH-QUALITY protection. Our name is stamped on each one. Write us for our Tri-Clover Catalog.

THE *Complete Line*

1. Trialloy (Cupro Nickel) Sanitary Fittings
2. Fabricated Stainless Steel Sanitary Fittings
3. Pumps (Centrifugal—non-agitating) Trialloy and Stainless Steel
4. Custom Fabrication
5. Sediment Testers
6. Line Filters

Standardized Accuracy and Interchangeability are YOUR Tri-Clover Guarantee.

ARMY E NAVY

TRI-CLOVER MACHINE CO.

2814 60th Street

KENOSHA, WISCONSIN

TRY TRI-CLOVER "THE *Complete* LINE"

PROCESSING

Food Processing Needs Half-Million Workers

IN announcing its plans for the interregional recruitment of migratory workers for the canning, dehydrating, drying, freezing and packing of perishable fruits and vegetables, the War Manpower Commission estimates that more of 500,000 part-time and full-time workers will be needed for processing the 1945 crop.

The number of migratory workers—those who follow the crops to work in food processing plants—will be a relatively small but important part of the total number of workers needed. For the most part, WMC said, communities will have to depend largely on volunteer labor furnished by youths, teachers, merchants, housewives and others.

Some of the anticipated labor needs of States for the food processing industry were estimated by WMC as follows:

Arkansas, 11,000; California (all-year needs), 125,000; Delaware, 5,500; Georgia, 5,000; Illinois, 15,000; Indiana, 30,000; Maine, 11,000; Maryland, 30,000; Michigan, 10,300; Minnesota, 15,000; New Jersey, 20,000; Ohio, 17,000; Oregon, 23,000; Pennsylvania, 13,000; Virginia, 13,000; Washington, 21,000; and Wisconsin, 22,000.

Flour Enrichment Test Developed by WFA Lab

A NEW chemical test which will indicate almost instantly whether flour is enriched, partially enriched, or unenriched has been developed by WFA, in its laboratory at the Beltsville Research Center. The new test will be used in connection with flour inspection by WFA's Office of Marketing Services.

The newly developed test requires the use of only two reagents—a four percent aniline solution in ethyl alcohol and a four percent aqueous cyanogen bromide solution. The actual test is simple. About one-half to one gram of flour is pressed on a white blotter or in the well of a porcelain indicator block. Two drops of the aniline solution are then dropped on the center of the flattened flour, followed by three drops of cyanogen bromide solution. Almost immediately a canary yellow color

How you can get ideal...low cost refrigeration...NOW!

MEMO

You need no reminder that the food industry rates high priorities. That's why even now — with all our press of war work — G-E can still supply refrigeration equipment to qualified buyers.

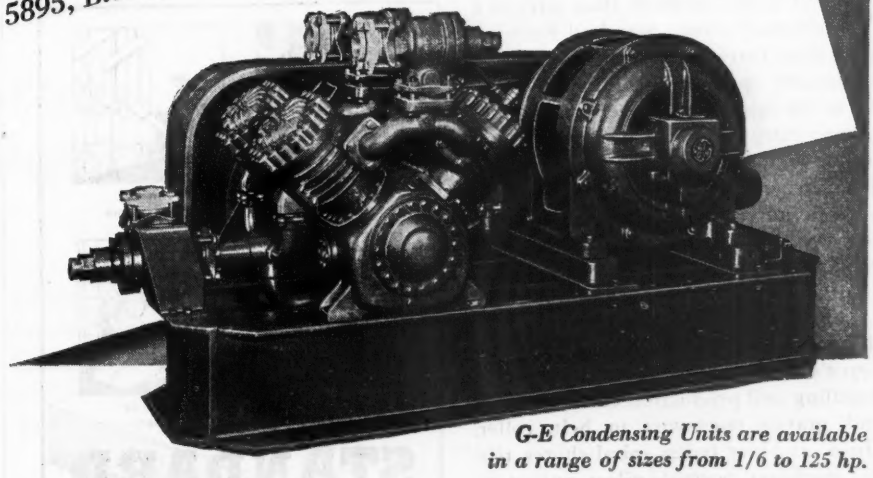
Keep your equipment at peak efficiency. Consult your G-E distributor or contractor.

Ask him to point out the economies you get when you install G-E Condensing Units — economies of space — of operating cost — and of upkeep.

Get more output from the same floor space — or equivalent capacity from less floor space.

Be sure that in the condensing unit — the very heart of your refrigerating system — you protect yourself with equipment bearing the famous G-E monogram — symbol of good design and expert workmanship the world over.

It will pay you to investigate and install G-E Condensing Units now for top efficiency in present and anticipated needs. For full information write: *General Electric Company, Air Conditioning and Commercial Refrigeration Divisions, Section 5895, Bloomfield, N. J.*



G-E Condensing Units are available in a range of sizes from 1/6 to 125 hp.

BUY... and hold ... WAR BONDS

GENERAL ELECTRIC

COMMERCIAL REFRIGERATION

Tune in: The "G-E HOUSE PARTY," every afternoon Monday through Friday, 4 p. m., E W T, C B S . . . The "G-E ALL-GIRL ORCHESTRA," Sundays, 10 P. M., E W T, N B C . . . "THE WORLD TODAY" News, Monday through Friday, 6:45 P. M., E W T, C B S

PUSH PRODUCTION UP

PUSH COSTS DOWN

with
STANDARD
PUSH-BAR CONVEYORS

CONVEYORS do more than carry in a horizontal plane. Standard Push-bar Conveyors carry and move packages and containers up a slope or incline at 30, 45, or 60 degree angles; vertical lift conveyors carry commodities straight up and down to the height of several floors. These conveyors that lift and lower can be used individually or combined with a conveyor system to provide uninterrupted flow of commodities between floors.

Push-bar conveyors and vertical lift conveyors are part of Standard Conveyor's wide variety of equipment to cut handling and production costs — power and gravity conveyors in belt, roller, chain, and slat types; spiral chutes, tiering machines, portable pilers, pneumatic tube systems.

Standard Conveyor has been headquarters for conveyors for more than 40 years; we are qualified by long experience to recommend and build efficient equipment for any given installation. Write for catalog FI-55, "Conveyors by Standard" — a profusely illustrated reference book that will prove very useful to you.

Spiral Chutes

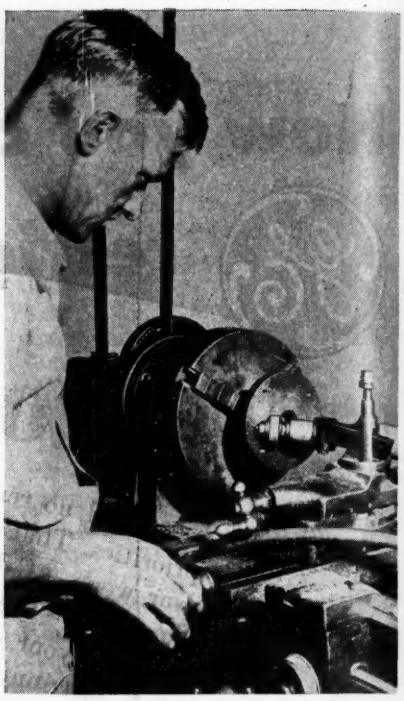
Pneumatic Tube Systems

Tiering and Lifting Machines

Portable Pilers

CONVEYORS

STANDARD CONVEYOR CO.
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities



SEALS RECLAIMED
Rubber valve seals used in filling milk bottles became swollen and unusable after three months' time at the Cleveland plant of Telling-Belle-Vernon Co. The maintenance superintendent decided to reclaim them by grinding down to exact size with a pneumatic grinder. The idea is saving hundreds of rubber seals a year, since each can be ground four or five times.

appears if the flour has been enriched, the depth of color depending on the amount of the niacin, one of the four enrichment ingredients, present in the flour. A comparison with flour containing known amounts of niacin, treated the same way, will indicate the niacin content of the flour tested.

As flour is ordinarily enriched by adding the ingredients in the proper proportions, a test for niacin only will indicate whether all ingredients have been added.

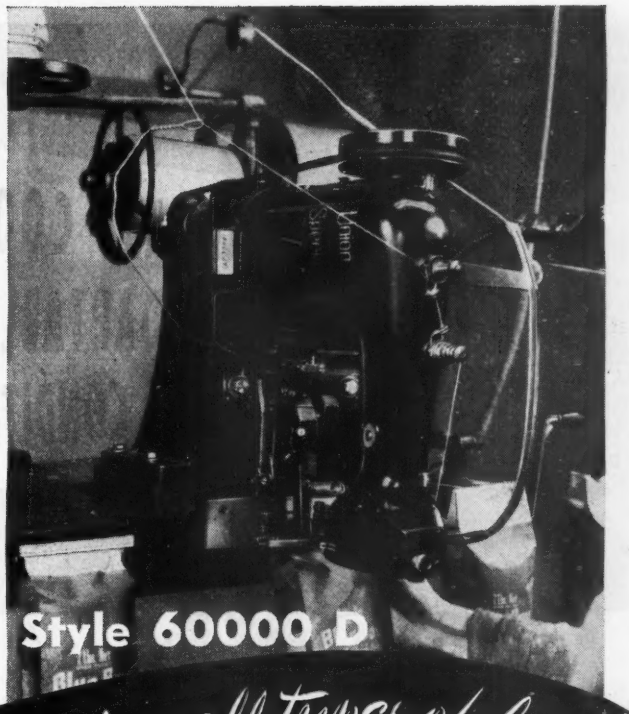
Ice Cream Mix Provided By Quartermaster Corps

WITH hot weather just around the corner, the Quartermaster Corps has anticipated the soldiers' demand for ice-cream by providing not only a deliciously rich ice-cream mix powder, but special recipes whereby eight additional flavors can be provided by using components regularly furnished in the standard "B" ration, which is provided to overseas troops where organized messes can be set up. It consists, in part, of non-perishables such as canned and dehydrated foods, stated Brigadier General J. E. Barzynski, Commanding General of the Chicago Quartermaster

Packaging in Small Paper Bags

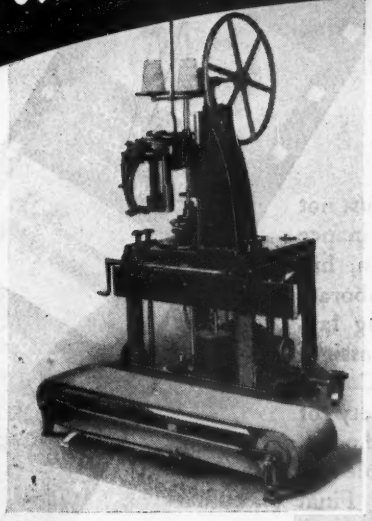
The *right* type of closure adds merchandising value to the small paper bag. That means a Union Special Dubl-Tape Closure. Install a UNION SPECIAL STYLE 60000 D sewing head in your packaging department and watch results! The method is fast and economical; the machine is easy to operate, adjustable to a wide range of bag sizes; compared to other bag closing equipment, the investment is modest.

The DUBL-TAPE CLOSURE, sewed with strong stitches through the double safety of two strong paper tapes, makes the small paper bag a neat, sturdy, good-looking package. It is inexpensive to produce and can be used on filled bags up to 25 lbs. size.



Style 60000 D

newer, better methods of closing all types of bags

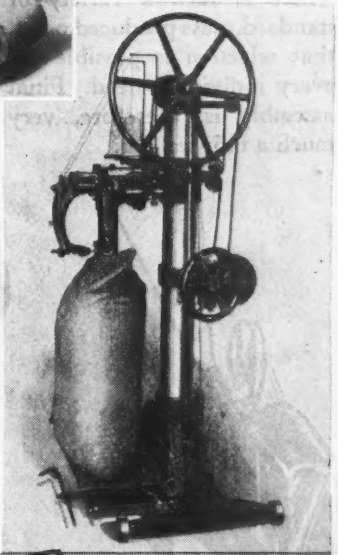


Style 21800 C
is for closing cotton, burlap and paper bags. Designed for mounting Class 14500 medium duty or 80600 heavy duty sewing heads. Independent or synchronized conveyor belt travel. Sewing head and conveyor adjustable vertically.

Closing Larger Paper and Fabric Bags

Machines for closing *all* types of fabric or paper bags are in the Union Special line, including sewing heads, columns, tables, conveyors and accessories. Combination installed to meet any requirement.

Write for Bulletin No. 200
UNION SPECIAL MACHINE COMPANY
450 North Franklin Street, Chicago 10, Illinois



Style 20100 D
is for general utility duty. Has Class 14500 sewing head and floating bag carrier which returns automatically to its loading position when closed bag is removed. Carrier and sewing head both adjustable vertically. Portability makes unit popular.

Union Special *Bag Closing Machines*

ROSS
"CP"
COOLERS

A STANDARD COOLER REALLY ADAPTABLE TO INDIVIDUAL CONDITIONS

CHOICE OF HEADS TO SUIT FOULING TENDENCY OF FLUIDS
BAFFLE SPACING DETERMINED BY FLOW RATES
VENTS, DRAINS, NOZZLES AND SUPPORTS IN ANY LOCATION
ROSS
Coolers
MORE SPECIFIC FACTS IN BULLETIN 5322 AVAILABLE PROMPTLY

The cooler you select must not only fulfill your performance needs to the maximum, but should not require elaborate changes in your piping layout. That's an average assignment for a Ross "CP" Cooler. There is such a variety of standard, mass produced parts, that selection is possible for every individual need. Final assembly is, therefore, very much a tailored job.

ROSS HEATER & MFG. CO., Inc.
American Radiator & Standard Sanitary Corporation
1443 WEST AVENUE BUFFALO 13, N. Y.

Depot. The Quartermaster Depot, in Chicago, does all of the procuring of the ice-cream mix, 155,000,000 lb. for 1945.

The ice-cream mix is furnished in vanilla flavor only, but it can be prepared in other flavors by the addition of the dehydrated fruit juice powders, canned fruits, and other ingredients provided in the regular "B" ration. The added flavors are: chocolate, lemon, fruit cocktail, peach, coffee, maple, pineapple and hard candy.

West Coast Food Firm Prepares for Expansion

ACTING in accordance with the company's announced policy of expansion in the general food business, the board of directors of Hunt Brothers Packing Co., last month, authorized a plan to change the name of the company to Hunt Foods, Inc. The plan, which is to be submitted for approval of stockholders at the annual meeting, May 23, also authorizes the exchange of three shares of new common stock for every two shares of the present outstanding common, and an increase in the authorized shares from 160,000 to 500,000.

Since the company's merger with Val Vita Co., they have bought the Fontanna Macaroni plant and the Columbia Pickle plant. There have been rumors, recently, on the West Coast linking Hunt and Rocky Mountain Packing Corp.

Army Specifications

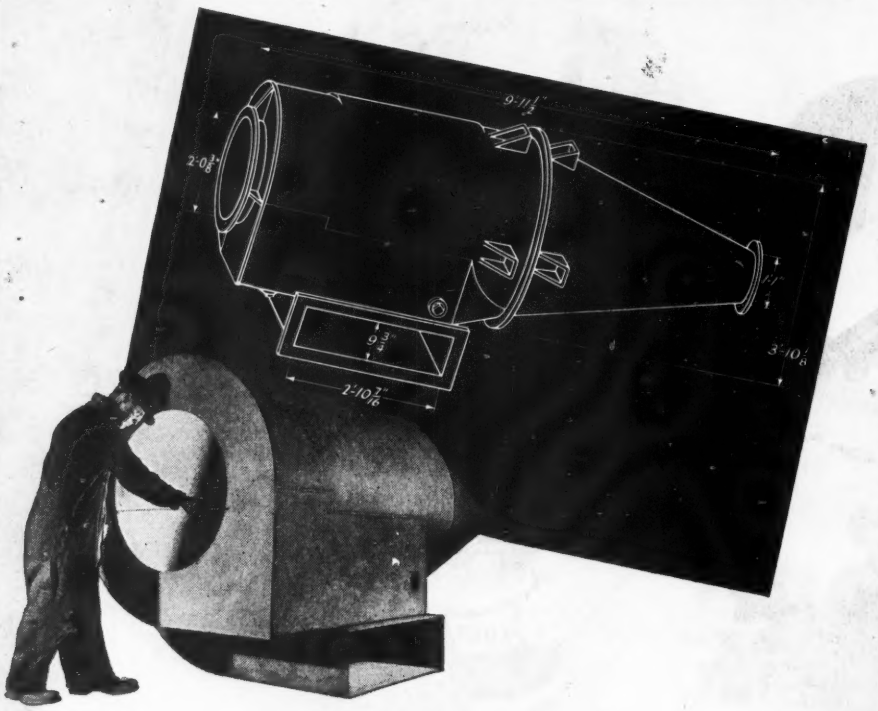
THE Quartermaster Corps has issued the following specifications. They are listed with the Chicago Quartermaster Depot number and date of issue.

Dehydrated Rutabagas, C. Q. D. No. 74D, Mar. 21, 1945, Superseding C. Q. D. No. 74C, Nov. 29, 1943. Pure Soluble and Soluble Product Coffee, C. Q. D. No. 322, Feb. 21, 1945. Packaging and Packing Spices, C. Q. D. No. 178B, Mar. 4, 1945, Superseding C. Q. D. No. 178A, Nov. 3, 1944. Celery Salt, C. Q. D. No. 362, Mar. 24, 1945. Garlic Salt, C. Q. D. No. 361, Mar. 24, 1945. Maple Flavoring Tablets, C. Q. D. No. 118C, Feb. 24, 1945, Superseding C. Q. D. No. 118B, August 29, 1944. Imitation Vanilla Flavoring Tablets, C. Q. D. No. 56B, Feb. 24, 1945, Superseding C. Q. D. No. 56A, July 15, 1944. Cocoa Beverage Powder, C. Q. D. No. 57D, Feb. 23, 1945, Superseding C. Q. D. No. 57C, Apr. 6, 1944. Cocoa, C. Q. D. No. 316A, Feb. 23, 1945, Superseding C. Q. D. No. 316, July 29, 1944. Flavored Dessert Powder Prepared with Starch, C. Q. D. No. 196, Feb. 23, 1945, Superseding C. Q. D. No. 196, July 13, 1944. Flavored Dessert Powder Prepared with Gelatin, C. Q. D. No. 157B, Feb. 23, 1945, Superseding C. Q. D. No. 157A, July 11, 1944, and used in lieu of Fed. Spec. C-G-191a. Canned Parboiled and Steam Roasted Beef, C. Q. D. No. 53A, Feb. 15, 1945, Superseding C. Q. D. No. 53, June 26, 1942. Kitchen Spice Pack, C. Q. D. No. 354, Feb. 26, 1945. Chewing Gum, C. Q. D. No. 324, Mar. 16, 1945. Ten-in-one Ration, C. Q. D. No. 140B, Aug. 1, 1944, Amendment-3, Mar. 13, 1945, Superseding Amendment-2, Oct. 24, 1944.

Fibre drums that can "take it".....Plastics for modern chairs
Handy pails for lubricants.....And cans for plums and pears
ARE ALL MADE BY CONTINENTAL CAN COMPANY
PLUMS
PEARS
Products and Divisions of Continental Can Co.
100 East 42nd St., New York 17, N.Y.
CONTINENTAL PRODUCTS: Metal Containers · Fibre Drums · Paper Containers · Paper Cups · Plastic Products · Crown Caps and Cork Products · Machinery and Equipment.
OPERATING DIVISIONS: The Container Co. Van Wert, Ohio · Keystone Drum Company, Pittsburgh, Pa. · Hamilton Fibre Can Division, Roxbury, Mass. · Mono Containers, Newark, N. J. · Plastic Division, Cambridge, Ohio. Rose Crown & Cork Co., Chicago, Ill. Cameron Can Machinery Co., Wilmington, Del.
FOREIGN SUBSIDIARIES: Continental Can Company of Canada, Limited; Sun Life Building, Montreal, Canada · Sociedad Industrial de Cuba, S. A., Havana, Cuba.
FOR PACKAGING AND PLASTIC PRODUCTS
KEEP YOUR EYE ON CONTINENTAL — FOR PACKAGING AND PLASTIC PRODUCTS

HERE'S ANOTHER IN CONTINENTAL'S snappy series of ads which show you at a glance the amazing variety of articles now Continental-made. Every ad shows exactly how Continental's increased facilities can bring you better all-round packaging service than you ever had before. Look for these ads running full-color in leading national magazines —*Time, Newsweek, U. S. News, Business Week, Fortune.* Keep your eye on Continental and on the Continental trademark, too. The Triple-C stands for *one* company with *one* policy—to give you only the very best in quality and service.

LARGE DIAMETERS



Buell's assurance of
HIGH EFFICIENCY, LOW MAINTENANCE, LONG LIFE

THE DECIDED ADVANTAGES of Buell's large diameter cyclones, made possible by the patented "Shave-Off", definitely reflect industry's growing preference for Buell (van Tongeren) Dust Recovery Systems.

Large diameters make possible a collection operation with low centrifugal force and permit construction of extra thick steel. This accomplishes two things: minimum abrasion and long life. *Large diameters* afford large dust outlets, making clogging practically nil. *Large diameter* cyclones have the added advantage of handling a given gas volume with fewer units.

Engineers who look to low cost up-keep and continuous operation as prime requisites in dust recovery should give these factors serious consideration.

BUELL FEATURES

SHAVE-OFF
LARGE DIAMETERS
EXTRA-STURDY CONSTRUCTION
CORRECT HOPPER DESIGN
SPLIT-DUCT MANIFOLDS
INNER WELDS GROUND SMOOTH

RESULT IN

HIGH COLLECTION EFFICIENCY
LESS FAN BLADE WEAR
LOW DRAFT LOSS
LOW POWER CONSUMPTION
HIGH TEMPERATURE RESISTANCE
UNLIMITED CAPACITY
NO MOVING PARTS
FREE DUST FLOW

PRODUCE

HIGH EFFICIENCY
LOW MAINTENANCE
LOW OPERATING COST
LONG LIFE
NO CLOGGING

buell
DUST RECOVERY SYSTEMS

Engineers and plant executives are invited to write for Buell's factual 28-page book:
"The van Tongeren System of Industrial Dust Recovery"

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Suite 5000, 8 Cedar Street, New York 5, N. Y.
Sales Representatives in Principal Cities

DESIGNED TO DO A JOB, NOT JUST TO MEET A "SPEC"

GENERAL

Larry Burton Goes To European Theatre

L. V. BURTON, editor of FOOD INDUSTRIES, took off for the European theatre, late in March, on a two-months leave of absence, during which he will investigate food matters on the Continent for the War Department.

This trip will virtually complete the food editor's round-the-world survey. Last September he returned from a six-month tour of Australia and New Zealand, where he functioned as a consultant to the Australian Food Ministry.

With the food outlook becoming more serious everywhere, and critical in the liberated and conquered countries of Europe, this visit coincides with what may well become the climactic period of the war and its immediate aftermath.

Having served overseas as an officer in the Quartermaster Corps, in World War I, Larry Burton returns to scenes that he hopes to find a little more familiar than were those in the Australian area.

Changes Proposed for Equipment Manufacture

MANUFACTURERS of commercial electrical food preparation equipment will receive 16 percent less carbon steel, in the second quarter of 1945, than they were allotted in the first quarter, and comparable amounts of aluminum and copper, according to War Production Board officials. The materials situation will be about the same in the third quarter as in the second, assuming military conditions cause no appreciable alteration of schedules.

Under a proposed amendment to L-65, which, if issued, will take effect July 1, manufacturers of commercial electrical food preparation equipment will be permitted to manufacture for military orders without limitation, except as imposed under the standard manpower clearances. Each manufacturer's production for civilian orders will be authorized on an individual basis. Authorizations to fill civilian orders will depend on a manufacturer's plant capacity and the availability of manpower.

Under the existing order, each manufacturer is permitted to produce for civilians 10 percent of his 1940 output, provided he has the standard manpower clearance.

There's a difference in HD oils

Comparison of Stanolube HD with other oils

OIL QUALITY	ENGINE TEST USED	Stanolube HD	Other HD Oils A	Other HD Oils B	Conventional Motor Oil C
Oxidation Resistance	36-hour Chevrolet Piston Varnish	9	9	8	5
	36-hour Chevrolet Engine Sludge	10	9	8	6
	500-hr. G.M. Diesel Piston Deposits	10	9	8	4
Detergency	Caterpillar 1-A Piston and Top Ring Deposit	9	9	8	4
	500-hr. G.M. Diesel Port Fouling	10	10	8	4
	500-hr. G.M. Diesel Filter Deposits	10	10	8	3
Bearing Corrosion Resistance	Caterpillar Hot Box	10	9	10	6
	36-hr. Chevrolet	10	9	10	6
	500-hr. G.M. Diesel	10	10	10	7
Load Carrying Ability	Caterpillar Scratch Test	10	10	10	6
Total Rating All Tests		98	94	88	51

Rating Explanation: 10—Excellent plus—Free from any deposits, corrosion, or scuffing. 9—Excellent. 8—Good. 7—Fair. 6 (or below)—Failure to pass —Heavy deposits, extensive corrosion or scuffing.

MANY OILS pass the tests that have been set up to determine an oil's suitability for use in Diesel engines or in gasoline engines under heavy-duty service. But that does not mean that all of these HD (heavy-duty) oils are the same.

Methods of testing HD oils are well established. They rate the qualities of an oil such as: oxidation resistance, detergency, corrosion, and other items listed in the first column of the table at right.

All HD oils are not the same because some oils excel in one or more qualities but are only passable in others. The table at right compares Stanolube HD's rating in all of these qualities with a number of other HD oils. The ratings given in the table are the result of many tests, under exactly similar conditions, for all the oils. Stanolube HD consistently rates *higher* in *more* of the qualities than any other tested oils.

What does this mean in actual service? Just this. Under present gasoline conditions and the heavy service demands on equipment, you need the greatest possible protection you can get to keep down varnish and other engine deposits, to guard against excessive wear on engine parts, bearing corrosion, or breakdowns caused by oil system failures. Stanolube HD gives this protection to a greater degree than other HD oils.

Find out how this greater protection can cut maintenance and replacement costs in your fleet. A Standard Oil Automotive Engineer can help you make this test. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

This table above compares Stanolube HD's rating in heavy-duty oil qualities with (A) the best of 10 other HD oils that passed the tests, (B) the lowest rated oil of the 10 that passed and (C) the rating of a high quality regular (not HD) motor oil. Such an oil is not usually subjected to these tests and is included here merely to indicate the severity of the tests by this comparison.

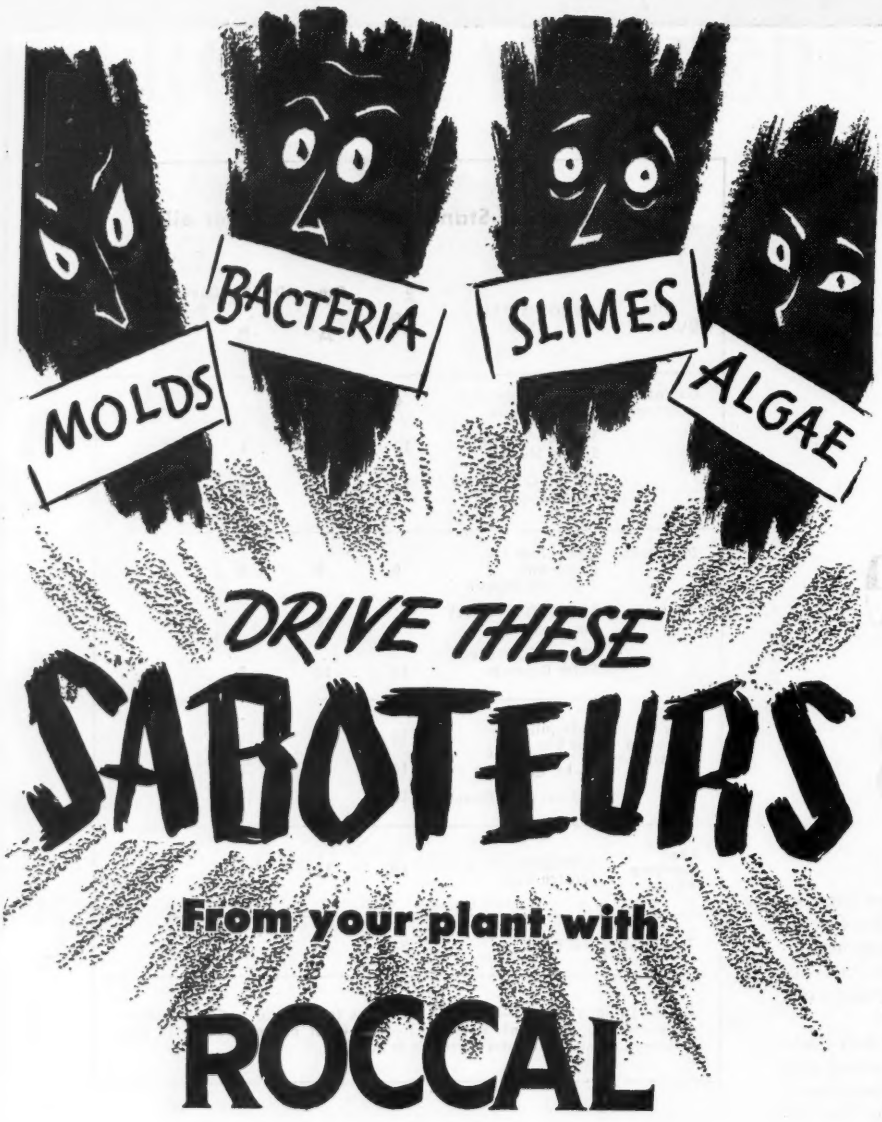
heat-proofed
Stanolube HD

Buy more War Bonds

STANDARD OIL COMPANY (INDIANA)

STANDARD SERVICE

★ FLEET CONSERVATION SERVICE



DRIVE THESE

SABOTEURS

From your plant with

ROCCAL

ROCCAL is a powerful new germicide and general sanitizing agent for use in keeping all food handling and packing equipment sanitary.

ROCCAL *kills bacteria!* It inhibits growth of molds, algae, iron bacterial growth and slime-forming organisms which "bug up" plant operation.

ROCCAL has been found acceptable by over one hundred leading public health authorities.

ROCCAL is sure, safe, economical. It does not interfere with regular plant operation.

ROCCAL is odorless, tasteless and non-poisonous in effective concentrations. A valuable advantage in the canning and food industries.

ROCCAL contains no phenol, iodine, active chlorine or heavy metals.

ROCCAL is non-corrosive. It does not injure fabrics, metal or rubber.

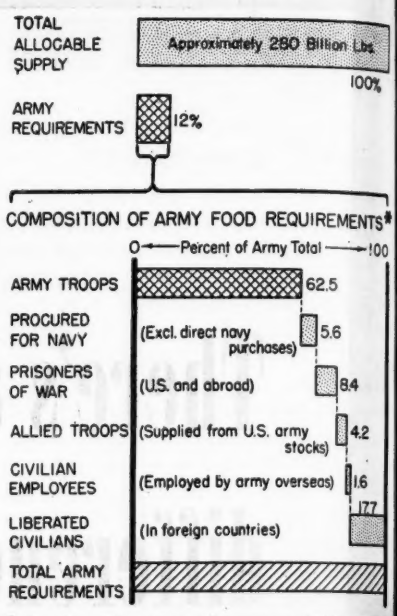
ROCCAL is stable . . . maintains its high germicidal properties over long periods of use. Does not deteriorate in storage.

FOR DETAILED INFORMATION
about the uses of ROCCAL in your industry, *write today!* Sample and literature on request.

Our armed forces are using ROCCAL at an ever-increasing rate. We are making every effort to keep up the civilian supply. Please be patient if you don't get ROCCAL on first call. Try again . . . it's worth the effort.

Industrial Division
WINTHROP CHEMICAL COMPANY, INC.
170 Varick Street, New York 13, N. Y.

WINTHROP ROCCAL
TRADE MARK REG. U. S. PAT. OFF. AND CANADA
Brand SANITIZING AGENT



* *Based on dollar values of program as of 1 Feb. 1945*

ARMY FOOD

Here is the way all that food the Army has been buying is distributed among the groups coming under its program.

Under the proposed new procedure, total quarterly authorizations for the entire industry for civilian orders will equal 10 percent of total quarterly 1940 production; but individual manufacturers would not be confined to a 10 percent ceiling. Some manufacturers who have capacity and manpower, and whose production would not interfere with the war program, might be authorized to exceed 10 percent of their 1940 output, during a quarter, in filling civilian orders. Others, operating in areas of manpower shortages, or engaged in other essential war production, might produce only a small quantity to fill civilian orders.

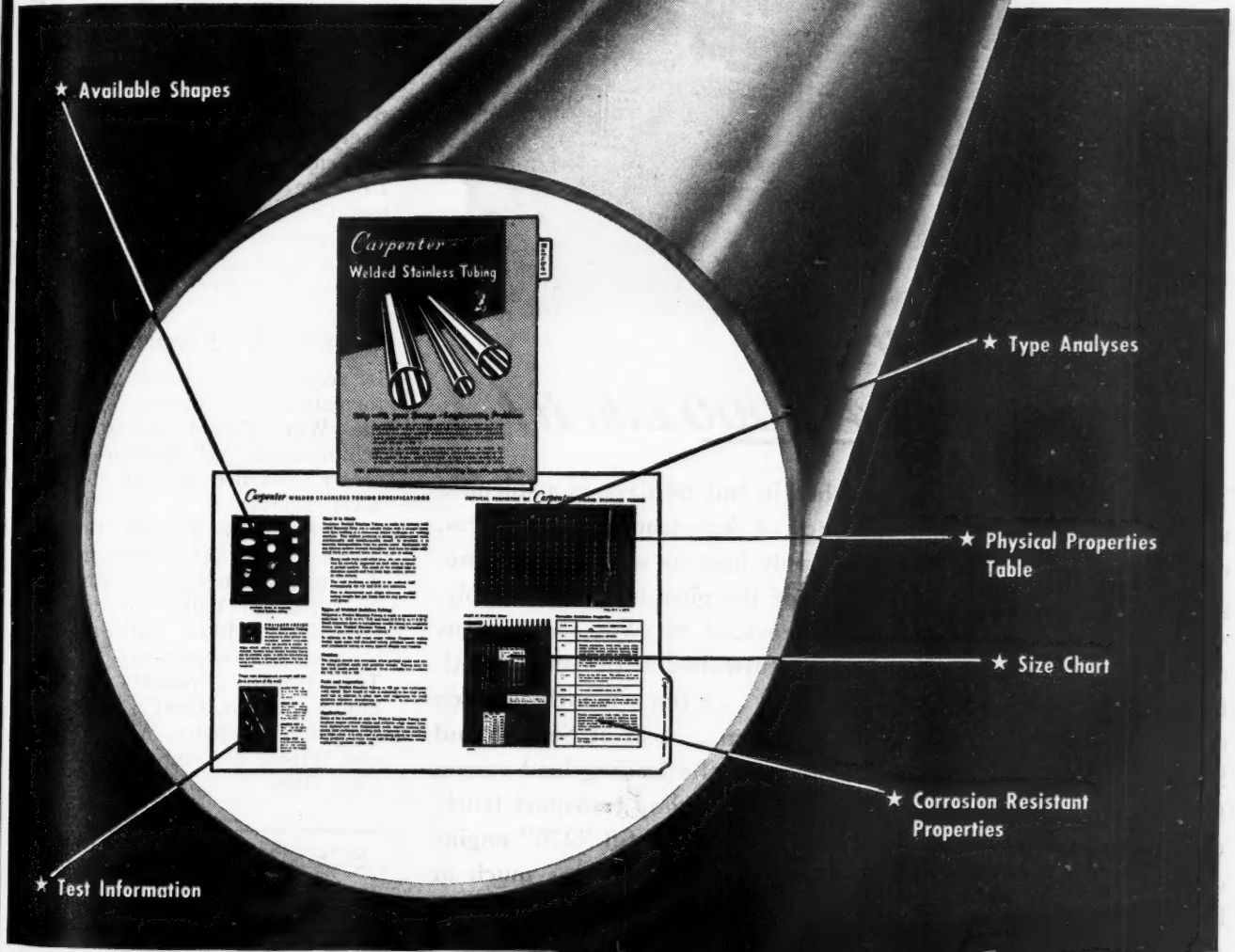
Clarification Seen for Social Security Bills

A NUMBER of bills that would change the Social Security Act and the Internal Revenue Code, as it affects food processors, have been introduced in Congress. Washington observers do not expect immediate action on any single piece of legislation. The social security law is probably due for a comprehensive overhaul, but not before next fall. By that time, the Ways and Means Committee will have had the opportunity to examine all proposals and incorporate them into a single piece of legislation.

Great opposition is expected, by Washington observers, if the trend is toward a centralization of control over social security. States in

Here's Help in Selecting Stainless Tubing

If your selection is pinned down by exceedingly tough specifications, the chances are you'll find what you want among the many types of Carpenter Welded Stainless Tubing. You may need tubing that is highly corrosion resistant at elevated temperatures. You may have to save weight in tubular parts which must have high structural strength. Or your specifications may call for odd and special shapes. To simplify your problem of selection, consult the Carpenter Welded Stainless Tubing Data File Folder. Compact and convenient to use, it gives you important engineering data—a result of Carpenter's pioneering in research and manufacture. If you do not have a copy, write for it without delay.



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WELDED ALLOY TUBE DIVISION
KENILWORTH, N. J.

Carpenter
WELDED
STAINLESS TUBING

Leading Load Carrier *on Leyte*

From LST to GMC is the word of the day in this supply scene from the Leyte Beach. Acme News photo.

GMC Has Built More than 475,000 Like It!

The conquest of Leyte, accomplished in but 68 days, is a splendid tribute to the courage and efficiency of American fighting forces, not only on battle lines, but on supply lines as well. The photograph above tells part of the story of the gigantic job of supply. An even better understanding is provided by War Department estimates that overseas Armies are furnished with 700,000 different items of equipment and supply . . . a ton a month for each man in combat. In the Leyte campaign . . . as at Salerno and Saipan, New Guinea and Normandy . . . the leading load carrier from beach to battle line was the Army's leading transport truck, the GMC 2½ ton "six-by-six." With its powerful "270" engine driving through all six wheels, it has proved to be as much at home in Pacific sand and swamp as in European mud and mire!

In addition to being one of the largest producers of military vehicles, GMC also manufactures many commercial trucks for essential users. These civilian GMCs are powered by engines of the same basic design as the famous GMC "270" used in the Army's leading transport truck.

INVEST IN VICTORY:::
BUY MORE WAR BONDS

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General Motors Corporation

HOME OF COMMERCIAL GMC TRUCKS AND GM COACHES . . .
VOLUME PRODUCER OF GMC ARMY TRUCKS AND AMPHIBIAN "DUCKS"

which large funds have been accumulated and where efficient operation has enabled them to reduce levies will be the opponents of any concentration of power in Washington.

Lambert Named

THE appointment of Dr. W. V. Lambert as assistant administrator of agricultural research has been announced by Secretary of Agriculture Wickard. Dr. Lambert comes to Washington from Lafayette, Ind., where he has been associate director of the Purdue University Agricultural Experiment Station since 1940.

To Present Osborne Medal

DUE to the cancellation of the annual meeting of the American Association of Cereal Chemists, which was originally scheduled for Toronto, the New York Section of the AACC will sponsor a special dinner meeting, at which the Thomas Burr Osborne Medal will be awarded to Dr. John C. Baker, Wallace & Tiernan Company, Inc. The presentation dinner will be held in the Grand Ballroom of the Hotel New Yorker, May 15.

Seven "A" Awards

IN recognition of outstanding performance in the processing of food, the War Food Administration achievement "A" banner was recently awarded to the following seven plants:

Burnham & Morrill Company, South Paris, Me.; Western Condensing Company, Heuvelton, N. Y.; Cedar Valley Produce Company, Osage, Iowa; California Consumers Corporation, Pasadena, Tear Garden Products Company, San Francisco, Calif.; Christensen Products Company, Weslaco, Tex.; and Wilson & Company, Oklahoma City, Okla.

SCHEDULE OF EVENTS

MAY

9—Retail Bakers' Day, simultaneous meetings of all local associations, in lieu of cancelled meeting of Retail Bakers Association.
29-31—Wholesale Grocers Association, annual meeting, Stevens Hotel, Chicago.

Officially Cancelled

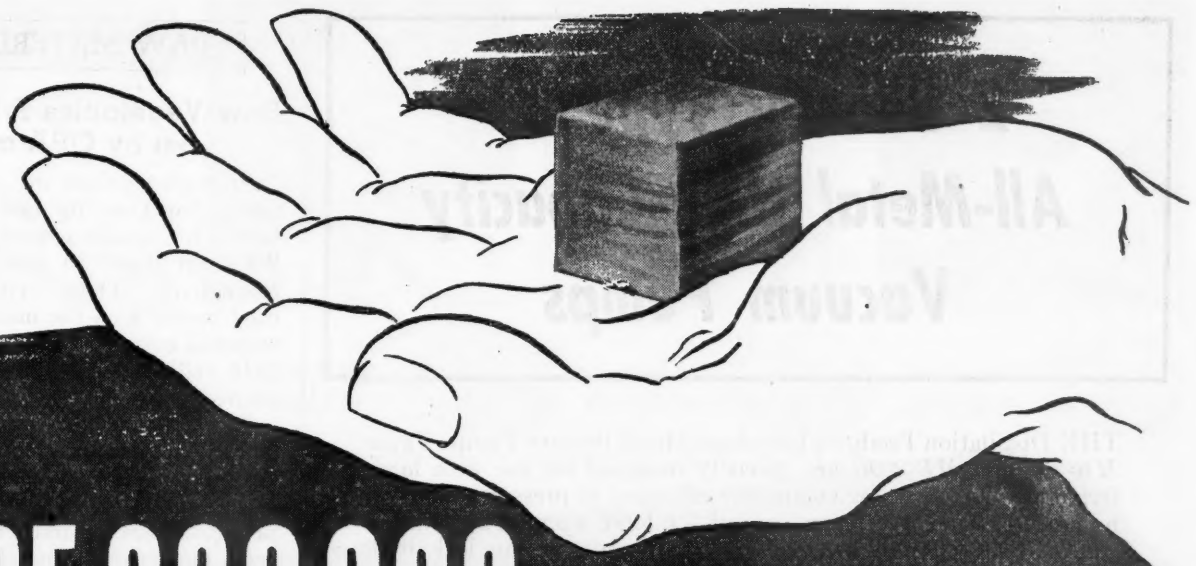
9-11—American Oil Chemists Society, New Orleans
15-18—American Association of Cereal Chemists, Toronto.
21-23—Institute of Food Technologists, Rochester, N. Y.
22-25—Society of American Bacteriologists, Detroit.

JUNE

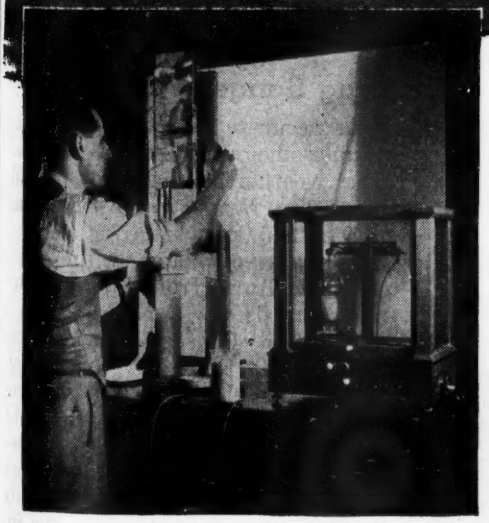
1-30—National Dairy Month.

Officially Cancelled

4- 5—Flavoring Extract Manufacturers Association, Chicago.
11-13—American Society of Refrigerating Engineers, Milwaukee.



35,000,000 Filter Elements TO THE CUBIC INCH!



In this scene in the Johns-Manville Filtration Laboratory, a research scientist is utilizing the special methods necessary to determine the particle size distribution of Celite Filter Aids.

THIS one-inch cube of diatomaceous silica contains upwards of 35 million individual particles known as diatoms . . . each one an efficient natural filter grid.

The largest known deposit of this material, located at Lompoc, California, is the source of the Johns-Manville Celite Filter Aids which have revolutionized modern filtration methods.

In its natural state, diatomaceous silica is a highly porous material composed of countless microscopic particles. The individual diatoms are light and open in structure . . . have low specific gravity . . . and are chemically inert. It is these characteristics, together with the wide variety of shapes and sizes, which give diatomaceous silica its excellent natural properties as a filtering medium.

From this raw material, J-M research scientists have developed filter aids which insure better clarification with faster flow rates in every filtration process. These Celite Filter Aids today speed the production of sugars, syrups, fruit juices, fats and oils, vitamins, drugs, field rations, lubricants, explosives and many other war-necessary products.

Tomorrow, they will provide the answer to every new filtration need of post-war processing.

Johns-Manville
22 East 40th Street, New York 16, N. Y.

Celite Filter Aids and Fillers

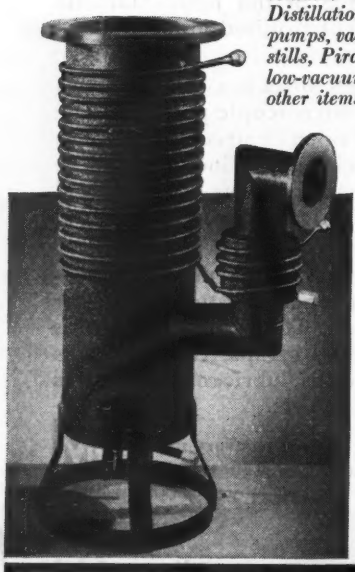
2 Booster Type . . . All-Metal High-Capacity Vacuum Pumps

THE Distillation Products two-stage Metal Booster Pumps *Types MB-200* and *MB-200G* are specially designed for use with large forepumps having a low volumetric efficiency at pressures below .5 millimeter. They are recommended for large vacuum systems in which a high pumping speed at .1 to 10 microns pressure is desired, or as a booster stage between a mechanical pump and an extremely high-speed diffusion pump. Typical applications are the vacuum smelting of magnesium, the high-vacuum drying of organic materials, and the vacuum impregnation of materials.

A vacuum in the order of 5×10^{-5} millimeter is obtainable with Butyl Phthalate or Butyl Sebacate. Other pumping fluids of even greater stability are available which give vacua of approximately 10^{-4} millimeter and permit operation against .4 millimeter backing pressure. A 1000-watt immersion-type heater is provided in the *MB-200* model, while gas burners adapted for any gas can be furnished in the *Type MB-200G*. Special features such as thermostatic controls, sight glasses, baffles, and threaded forepump connections can be incorporated when requested.

SPEED	200 l/s. at 5×10^{-4} mm. Hg
ULTIMATE VACUUM	5×10^{-5} mm.
MAXIMUM FOREPRESSURE	0.5 mm.
HEATER INPUT	700 watts
PUMPING FLUID	Butyl Sebacate
HEIGHT	23½ in.
DIAMETER	6 in.

Further data on these two pumps is available on request . . . General catalog contains information on the complete Distillation Products line of diffusion pumps, vacuum coating units, molecular stills, Pirani gauges, Ionization gauges, low-vacuum-pressure fluids, greases, and other items for high-vacuum technology.



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DP INC. HIGH-VACUUM HEADQUARTERS

DISTILLATION PRODUCTS, INC.

Jointly owned by EASTMAN KODAK COMPANY and GENERAL MILLS, INC.

ROCHESTER 13, N. Y.

RAW MATERIALS

Raw Vegetables Prices Set by OPA and WFA

DESIGNATED prices on eight vegetables for freezing and ten vegetables for canning were issued by WFA on April 10 and March 27, respectively. These prices will be used by OPA as the maximum raw material costs to be reflected in the 1945 ceiling prices for frozen and canned products.

In addition to the vegetables named, a miscellaneous group was designated as subject to an increase up to 20 percent over 1942 prices. There is only one change from last year's schedule of prices. Cabbage for kraut is increased from $12 to $15 per ton.

Agree on Sugar Price

THE compromise price to be paid for the 1945 Cuban sugar crop will not result in any change in the price of sugar in this country. Early in April, the State Department disclosed that the negotiaions had resulted in an agreement on the price of 3.1 cents per pound. This compares with the price of 2.65 that was paid previously, both being FAS Cuba. The difference between 2.65 and 3.1 cents per pound is to be paid by CCC as a subsidy.

Long Range Weather

MORE accurate "know-when" of the troublesome drought as well as other weather hazards, may be added to the farmer's growing fund of weather knowledge as the result of a study made by the Dept. of Agriculture, from Weather Bureau records.

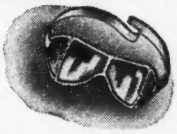
The Soil Conservation Service, which made the study, has developed a statistical method of gaging the probable occurence of drought in any locality in the United States at any time of the year. Although the complex method is necessarily limited to use by scientists, the information obtained may be used by agronomists and others, for the farmer's benefit, in adapting soil and water conservation work, as well as other farm activities, to weather conditions.

Pea Standards

TENTATIVE standards for grades of frozen peas have been issued by the War Food Administration, office of marketing services. They became effective March 15.

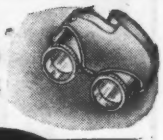
SUN GLASSES

SKIING GLASSES



SWIMMING GOGGLES

WELDING GOGGLES



IN METALS TOO
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SELECTION GUIDE TO INCO NICKEL ALLOYS

PROPERTY:	MONEL	"K" MONEL	"S" MONEL	"R" MONEL	"KR" MONEL	NICKEL	"Z" NICKEL	INCONEL
CORROSION RESISTANCE	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
STRENGTH	GOOD	GOOD	HIGH	HIGH	GOOD	GOOD	HIGH	GOOD
TOUGHNESS	GOOD	GOOD	HIGH	GOOD	GOOD	HIGH	HIGH	HIGH
HARDNESS	GOOD	GOOD	GOOD	GOOD	HIGH	FAIR	HIGH	GOOD
MACHINABILITY	GOOD	HIGH	GOOD	HIGH	GOOD	GOOD	GOOD	GOOD
NON-GALLING	NO	NO	NO	NO	HIGH	NO	NO	NO
SPRING PROPERTIES	GOOD	NO	HIGH	NO	NO	GOOD	HIGH	HIGH
ELEC. CONDUCTIVITY	POOR	POOR	POOR	POOR	POOR	GOOD	GOOD	POOR
HEAT RESISTANCE	GOOD	GOOD	GOOD	GOOD	HIGH	GOOD	GOOD	HIGH
HEAT TREATABLE	NO	NO	YES	YES	YES	NO	YES	NO
NON MAGNETIC	NO	NO	YES	YES	YES	NO	NO	YES

When it's a question of finding a metal for some tough job you have in mind there is a quick way to look for a ready answer...

Take a look at the family of Inco Nickel Alloys—strong, hard, corrosion-resisting and absolutely free from rusting, every one of them. Those are the family characteristics of the eight Inco Nickel Alloys.

Which one should you choose for your particular job?

It all depends on what you want to do.

From this "Selection Guide" you can see how each one provides a different combination of advantages for different types of work.

Then write for a copy of our List "B-100" which lists more than 100 technical bulletins and publications that explain the properties, corrosion-resisting characteristics and practical applications of these INCO Nickel Alloys. It is yours for the asking.

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American Spectacle Co., N. Y.—Black Star, N. Y.

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Save their cost over and over again!

TOPMOST PROTECTION
Far greater safeguard to clothing than ordinary aprons!

AMAZING STRENGTH
Plus lightness in weight for utmost wearing comfort!

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27 x 36..$10.00 per doz.
30 x 36.. 11.25 per doz.
36 x 40.. 15.00 per doz.
36 x 44.. 18.50 per doz.
Full Length Sleeves $10.25 per dozen pair
Leggings, Hip Length $20.00 per dozen pair

BLACK NEOPRENE
27 x 36..$12.90 per doz.
30 x 30.. 14.00 per doz.
36 x 40.. 18.33 per doz.
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Full Length Sleeves $12.90 per dozen pair
Leggings, Hip Length $23.50 per dozen pair

ALL WHITE
27 x 36...$6.88 per doz.
36 x 36.. 7.65 per doz.
36 x 40.. 9.35 per doz.
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OLIVE GREEN
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30 x 36.. 6.71 per doz.
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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

NEW RAIL STRAINS—Goods movement for military destinations will follow a new pattern as Jap killing becomes task No. 1, now that Nazi extermination can be given second position in the priorities of Washington. This means that goods can move more freely near the Eastern Seaboard but that Gulf Coast and Pacific port areas will be more congested. Each plant management must figure out for itself what this means in future planning for in-bound raw materials and for out-bound products. It will be a lucky management that finds things better instead of worse. The long hauls to and from the Pacific will do considerably more damage to civilian goods movement per ton of military goods moved. There are so many more miles involved that the lessor tonnage may tie up freight facilities even more than European supply has done. And we must remember that we still have a European army to feed and service.

TO REDUCE TURNOVER—Washington is urging industrial executives to reduce the loss of war plant workers by interviews when a worker gives notice of his intention to quit. By persuasive effort in personal interviews such employers are able to hold a great many persons who otherwise would be lost. The same principle certainly applies to employers in food plants. Here is a good place for the most skilled and experienced employment personnel to benefit both company and workers.

NEW TARIFF PLAN—A cut in tariffs to aid postwar trade abroad has long been planned. The Administration now offers a new legislative device for that purpose. It proposes that the President be given extended authority to cut statutory tariff rates for an additional three years, but permits cuts greater than before. This is not altogether clear from the form of the bill proposed in Congress because it still talks about a 50 percent cut as the maximum permissible; but the bill now uses the January 1, 1945, prevailing rate as the base instead of the statutory rate passed by Congress. Thus, a tariff could be cut to one-quarter of the original, a huge change in the international economy for some commodities.

GREATEST CROP, BUT — "The greatest harvest of agricultural products ever produced . . . was successfully moved during 1944 . . ." and yet Washington insists that the American people are going to suffer the greatest scarcity of food that they have ever experienced. These facts explain the naming of an important committee of high officials to investigate the food situation and exercise export control. However that administration action of former Assistant President Byrnes does not satisfy Congress. There will be bitter controversy and debate for months to come. One observer says, "It remains to be seen who can lie the loudest."

MORE SOCIAL SECURITY—One of the definite plans of Washington planners is to put many millions more people under social security. Most discussed, because they are politically most interesting, are domestic servants, agricultural workers, self-employers, and a few other groups not now covered. It remains to be seen whether the housewives, the farmers, and the self-employers can get well enough organized to persuade Congress that these extensions of the law are not necessary. If the agricultural workers are included then the cost of agricultural products, the raw materials for food making, will increase. Food technologists are correspondingly interested.

THE FOREMAN ISSUE—War Labor Board has several times reversed itself on one or another phase of the question of organization of foremen. A substantial group of industrial leaders is urging that Congress decide whether these junior management workers are employees who must be unionized for collective bargaining, or whether they are a part of management. The former "labor government," of course, favored unionization since the unions want it. Congress may dodge the issue. In that event the foremen question will be a hot one in many food plants for some time to come.

UNAVAILABLE'S CEILING—OPA has fixed a ceiling price on imported Swiss cheese. There is no cheese coming in. But we have a ceiling! Perhaps this is a part of the postwar planning of OPA to keep prices down after goods movement is resumed with Europe.

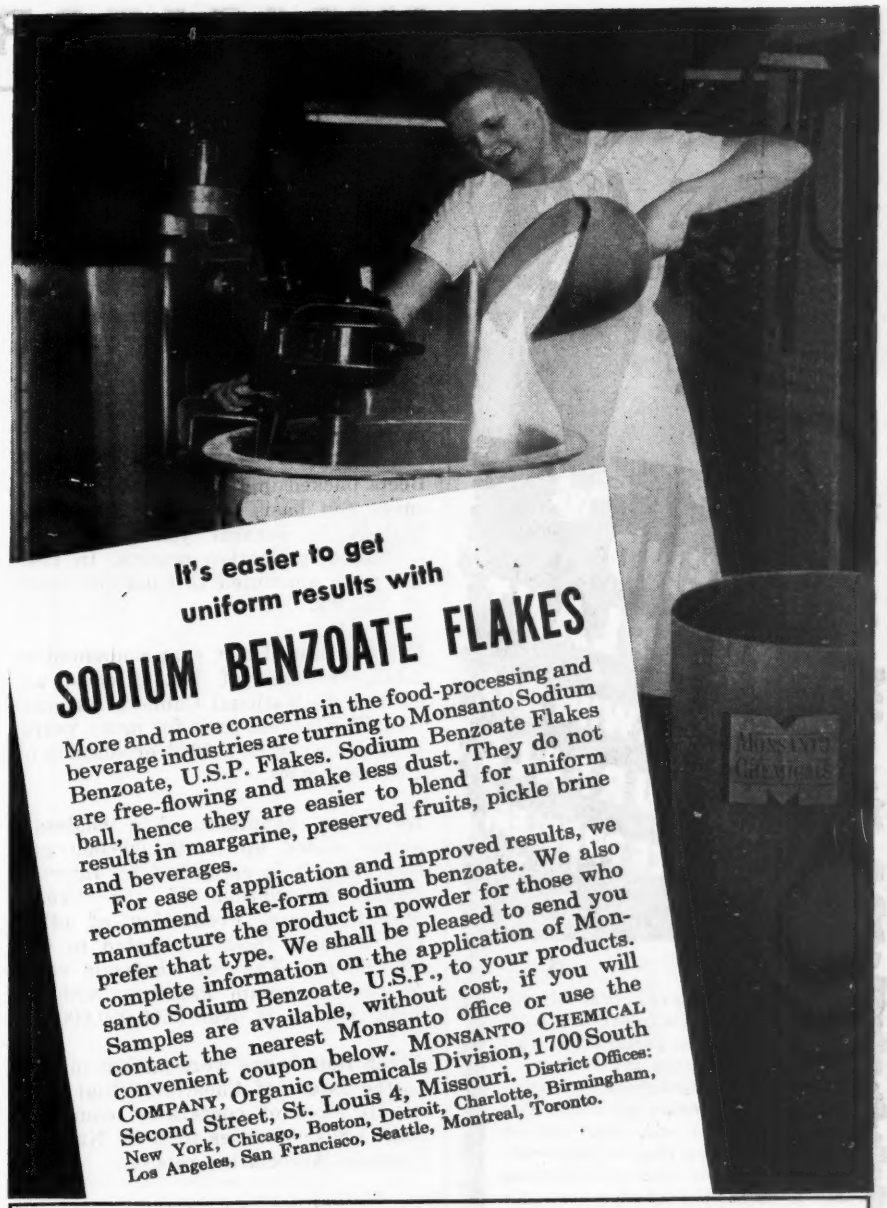
UNIONS' LONG ARM—United Mine Workers set up two new requirements in their demands on coal companies during the March and April debate for a new wage agreement. Neither was included in the final contract, but both are significant as they represent new types of demands that are likely to become fashionable, perhaps even in food plant labor contracts. One of these required that employers furnish only union-made tools and

explosives. The other would have permitted a strike of mine workers intended to prevent movement of coal to firms whose employees were on strike. Thus the powerful miners union sought to force unionization of firms selling to their employers and for the workers of their employers' customers also. Suppose that a food plant union should demand that packaging materials should be union made, that peas must be grown by union farm labor, or that the manufactured foods produced should be sold only to stores having unionized employees. This is a nice thought, isn't it?

SHEEPSKIN NOT REQUIRED—To get a job with Uncle Sam as a junior professional worker, it is no longer necessary for a young man or a young woman to graduate from college. Three years of "appropriate" practical experience is a substitute for a college graduation under this theory, whereas formerly college graduation was necessary. The heads of technical bureaus in Washington are highly indignant because they regard this as a very dangerous threat to research staffs. Possibly food company executives will be glad that the Government is no longer one of their competitors in bidding for the service of these promising young college graduates. Anything which will make it easier to get good young technical talent into the food plants of the country will be welcome.

PATENT TO BE FORFEIT—The antitrust division of the Department of Justice is urging that Congress pass a law that might make it easy to enforce antimonopoly regulations. The idea is that a firm that has misused patents must forfeit the patent. It is not at all clear whether Congress is going to take this very drastic suggestion seriously. But the Antitrust Division officials have offered to rewrite the pending legislation so that it will have this effect. It appears likely that Congress will want to do its own rewriting if any is done.

WHAT IS A CO-OP?—In discussing postwar use of government plants for making fertilizer materials, National Planning Association has emphasized that all commercial production should be "by private industry, including farm cooperatives." They also say, "private industry includes farm cooperatives." Thus one of the middle of the road groups representing industry, labor, agriculture, and many other divisions of American enterprise treats the cooperative just like any other kind of privately owned and managed business. This question is one that is very important to many food manufacturers. They will want to note this new trend carefully as it may largely influence the buying and selling policies of many food firms.



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For ease of application and improved results, we recommend flake-form sodium benzoate. We also manufacture the product in powder for those who prefer that type. We shall be pleased to send you complete information on the application of Monsanto Sodium Benzoate, U.S.P., to your products. Samples are available, without cost, if you will contact the nearest Monsanto office or use the convenient coupon below. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

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INDICATORS

Production

Candy production in 1944 reached an all-time high of 2,750,000,000 lb., 8 percent above that of 1943, National Confectioners' Association reports. The output was valued at nearly $650,000,000, compared to $575,000,000 in 1943. Much of the increase is attributed to government purchases, for which the manufacturers were permitted to buy special allotments of sugar, chocolate, peanuts and other ingredients.

Beets packed in 1944 totaled 7,504,000 cases (on basis of No. 2 cans), the highest in several years, National Canners Association reports. In 1943 the pack amounted to 6,059,000 cases of No. 2's.

Carrots canned last year amounted to 2,445,000 cases of No. 2 cans, according to National Canners Association. The largest pack for many years, it compares with a 1943 production of 2,384,000 cases.

Ice cream manufactured in wholesale plants added up to 434,000,000 gal. last year, it is estimated by International Association of the Cream Manufacturers. Production of other frozen dairy foods amounted to 68,000,000 gal. The net wholesale value of the ice cream industry, with its 4,000 plants, is over $500,000,000.

Fresh lima beans were packed in 1944 to the extent of 1,569,706 actual cases of all sizes of containers, compared with 1,864,080 cases in 1943, National Canners Association reports.

Flour milled in March was up 1,420,263 sacks over the output for the same month of 1944, according to *The Northwestern Miller*. Production totaled 15,576,972 sacks, representing 73 percent of the total for the country. A year ago the figure was 14,221,672 sacks; a month ago, 14,156,709 sacks. Preliminary figures on durum products (for nine companies) put March, 1945, production at 778,338 sacks against 692,246 a year earlier.

Salmon packed in British Columbia in 1944 totaled 1,097,557½ cases, as against 1,259,221½ a year earlier. Higher prices, however, raised the value of the pack from $14,740,298 in 1943 to $15,623,304 last year.

Creamery butter production in February was put at 92,320,000 lb., down 13 percent from a year earlier, 20 percent below the 10-year average and the smallest February production since 1925. That was the tenth successive month in which production was lower than for the same month in any of the past 15 years.

American cheese produced in February amounted to 51,720,000 lb., 13 percent higher than a year ago and 51 percent above the 10-year average.

Materials

Spring vegetable crop indications on April show an aggregate tonnage about 8 percent greater than in 1944 and nearly one-third larger than the 1934-43 average. Production of each spring crop is estimated to be above that in 1944, except for cauliflower, spinach, early spring asparagus and onions. An increase in early spring snap beans more than balances an indicated reduction in the mid-spring group.

Fats and oils will continue in tight supply. Military, foreign relief and other requirements are increasing at the same time that domestic output is decreasing. No important increase in imports is expected this year.

In Storage

Food stocks in cold storage continued to decline in March. On April 1, cooler occupancy was 67 percent, compared with 68 percent a month earlier, while occupancy of public freezer was 66, down 3 points from March 1. Being contrary to the normal, the decline in cooler occupancy reflects the growing scarcity of foods throughout the country.

Meats and lard in cold storage on April 1 were at a new low for the

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CONSTRUCTION NEWS

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1945 (thousands)
Bakery	$ 80	$ 93	$ 163
Beverages	140	...	80
Canning and Preserving	340	43	883
Cold storage	555	260	1,062
Confectionery	50	...	150
Grain Mill Products	632	436	1,654
Ice, Manufactured	170	...	320
Meats and Meat Products	165	...	182
Milk Products	90	288	1,213
Miscellaneous	1,469	490	6,340
Complete 1945 total	$3,691	$1,610	$12,047

date. Total meat stocks were 34,200,000 lb. less than the previous April 1 low in 1936, and lard and rendered pork fat stocks were 11,100,000 lb. less than the previous low. Beef, however, moved into storage during March, instead of out, as is normal. Lard was withdrawn, whereas it ordinarily moves into storage in March.

Creamery butter in cold storage on April 1 amounted to 29,600,000 lb., only 2,700,000 lb. below the 5-year average but 52,500,000 lb. less than the highest holdings, a year earlier.

Shell eggs in storage on April 1 totaled 1,777,000 cases, 78 percent of the 5-year average but only 40 percent of holdings on April 1, 1944. The movement into storage in March was 1,300,000 cases, compared to 2,500,000 cases last year.

Fishery products continued a heavier-than-normal movement out of storage in March, the 39,500,000 lb. holdings being 13,000,000 less than a month earlier but only about 1,000,000 lb. below the 5-year average.

Fruit and vegetable stocks decreased substantially in March, with the exception of fresh vegetables. Withdrawal of 22,800,000 lb. of frozen fruits in March dropped the holdings to 194,300,000 lb. Frozen vegetables moving out of storage during the month amounted to 23,800,000 lb.

Poultry in cold storage on April 1 totaled 82,125,000 lb. compared to 97,719,000 lb. a month earlier.

Indexes

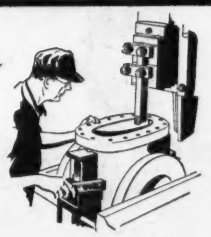
Business activity index of *Business Week* was 232.8 for the week ended April 14, as against 232.5 a month earlier and 238.4 a year ago.

Wholesale price index of foods, compiled by Irving Fisher, stood at 120.5 on April 20, compared with 121.1 on March 16 and 120.8 on April 21, 1944.

Cost of living index of National Industrial Conference Board for March was 105.4, compared to 105.5 a month earlier and 103.5 a year ago.

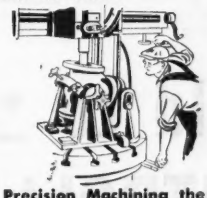
LUNKENHEIMER PRECISION

ASSURES PERFECT-FITTING INTERCHANGEABLE PARTS . . . LONGER VALVE LIFE . . . EASIER, LOWER-COST MAINTENANCE



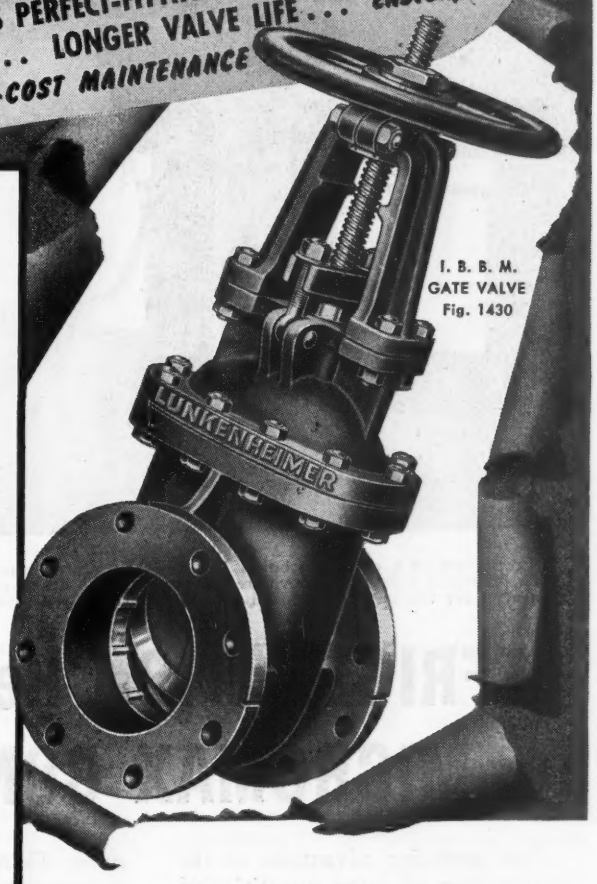
He Gives Lunkenheimer Valves Something Other Valves Haven't Got

He machines body guides down to precision tolerances, assuring a perfect guide for the disc and creating a positive center line on which all subsequent machining operations are based.



Precision Machining the Body for Seat Rings

is precision work to the "nth" degree, for this operation makes inserting the seat rings in a Lunkenheimer gate valve simply a matter of screwing them into position.



I. B. B. M. GATE VALVE Fig. 1430

● The smooth-working efficiency and low maintenance cost of Lunkenheimer Valves were not "made in a day". Behind this superior performance and economy lies long experience, and an ideal of precision which guides every operation from design to final assembly.

Lunkenheimer Valves have a streamlined simplicity of design . . . a minimum of working parts, each part of extra strength, correctly proportioned and perfectly balanced. This assures longer life with the least trouble and maintenance expense.

A Lunkenheimer Distributor is located near you, equipped and ready at all times to help you solve problems of maintenance or operation.

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI 14, OHIO, U.S.A.
NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 7
EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.

Bronze, Iron, Steel and Corrosion Resistant Alloy Valves, 125 to 2500 Lb. S.P.; Boiler Mountings, Lubricating Devices, Aircraft Fittings

LUNKENHEIMER VALVES

Six streams of a certain technical fluid are being refrigerated to temperature bands only half a degree wide by means of equipment which the Micromax Controllers above are regulating, in the drug-manufacturing plant of Hoffmann-La Roche Inc., at Nutley, N. J. These instruments solve this automatic control problem in extremely dependable fashion.

REFRIGERATION Held to ±¼ Degree By MICROMAX CONTROLLERS

Four operating advantages in the refrigeration of large quantities of liquid are gained by the use of Micromax temperature control in the big Hoffmann - LaRoche establishment. These advantages are:

1. Temperature is held to the desired band of one-half degree C.

2. Within this band temperature is almost absolutely uniform. It moves from one permitted extreme to the other in steps which are evenly spaced and evenly paced.

3. Temperature is recorded in great detail, on charts which accompany the material to the next process.

4. Refrigerant is used with high efficiency and economy.

The control instruments employed are Micromax Recording Controllers, using Thermohms (L&N electrical resistance bulbs) as detectors of temperatures.

Operator changes the temperature setting of one of the Micromax Controllers.

The equipment is highly sensitive; Thermohms now make available to the process industries the sensitivity and dependability for which resistance thermometers have long been used in laboratories and power plants. Thermohms and Micromax, designed for each other in every detail, carry the micro-responsiveness of their combination straight through to the control valve, to help maintain the quality and quantity of war-needed drugs, foods and chemicals.

Other types of Control and a wide variety of Micromax instruments are available, backed by L&N experience running back to the beginnings of automatic control. If you have a control problem, an L&N engineer will be glad to talk to you about it, or will send a catalog, as you prefer.

depends on me!
A Slogan For Every American

Jrl. Ad N38C-706(2)

LEEDS & NORTHRUP COMPANY, 4912 STENTON AVE., PHILA., PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

MEN • JOBS • COMPANIES

INDUSTRY

Blue Plate Foods Corp., New Orleans, plans to erect a manufacturing plant and distribution center at Charlotte, N. C.

E. J. Brach & Sons, Chicago, has made a gift of $10,000 to the Armour Research Foundation. The foundation plans to use half the amount to purchase library books and the other half for the purchase of additional equipment for the Chemical Engineering group.

Doughnut Corp. of America, Chicago, has acquired an entire block on which they plan to build a three-story building, to house their Midwest offices, a warehouse and production facilities, as soon as building restrictions are eased. The plant will be the largest in the world, with a weekly capacity of 3,000,000 doughnuts.

Fremont Kraut Co., Fremont, O., has reopened its plant in Green Springs, O., for the purpose of making kraut from cabbage shipped from Florida.

Frosted Fruit Products, Los Angeles, custom packers of fresh frozen fruits, announce that P. J. Welter has joined its staff and will be in charge of plant production. Mr. Welter was formerly production manager of Kemps Ice Cream Co., Minneapolis.

General Foods Corp. has completed negotiations for the purchase of the good will, assets and business of the Atlantic Fisheries Co. Plans have been made to expand operations and facilities of the fisheries.

FRANK E. GORRELL — CARLOS CAMPBELL

Having served as secretary of National Canners Association since its inception in 1907, Frank E. Gorrell asked that his name not be presented for the office this year. He is succeeded by Carlos Campbell, who came to the Association in 1934, as director of the division of statistics, and was more recently executive assistant to the secretary. Mr. Gorrell has accepted the office of treasurer.

Hunt Brothers Packing Co., Hayward, Calif., recently announced the acquisition of two additional food plants, in a broad expansion program planned for the company. The plants are Fontana Food Products Co., San Francisco, manufacturers of spaghetti, macaroni, egg noodles and other paste products, and Columbia Pickle Co., Portland, Ore., according to Norton Simon, board chairman.

GEORGE M. MOFFETT — MORRIS SAYRE

Corn Products Refining Co. has recently elected Morris Sayre president of the company. He succeeds George M. Moffett, who became chairman of the board, a newly created post. Mr. Sayre has been associated with Corn Products in many capacities over the past 37 years, and will assume active direction of the company's operations. A chairman of the board was regarded as necessary, by the board of directors, because of the expanding domestic business, postwar developments in new products, and the renewal and enlargement of foreign operations. Mr. Moffett expects to concentrate on the study and direction of the company's future policies.

Neuhoff, Inc., Wilson, N. C., is making preliminary preparations for the construction of a $500,000 meat packing plant in that city.

Safeway Stores, Inc., have completed arrangements for purchase of the capital stock of the Sterling Meat Corp., Vernon, Calif. Safeway will operate the plant at full capacity, with 60 percent of the beef going to the government.

Shephard Point Packing Co., near Cordova, Alaska, was damaged by fire last month at an estimated loss of $250,000. Valley Mills Co., Jackson, Miss., lost its plant by fire on March 24. Damage was reported at $500,000.

J. M. Smucker Co., Orrville, O., has announced its purchase of Keener Foods, Inc., Salem, O. The Keener plant will be used to process local apples for use in fruit butters, preserves and jellies at the Orrville plant.

Standard Brands Project, Dallas, Tex., has received authorization from the War Department for construction of facilities for manufacture of yeast at an estimated cost of $1,099,025.

Steele Canning Co., Springdale, Ark., is building a large new tomato cannery at Rogers, Ark. The plant will be one of the largest canneries in the Ozarks.

Summerland Co-operative, Summerland, B. C., announces that work has started on the erection of a new $90,000 cannery.

Tea Garden Products Co., has purchased a tract of land in Grandview,

STAINLESS STEEL STORAGE and PROCESSING TANKS

INCREASE PRODUCTION and EFFICIENCY IN YOUR PLANT WITH THESE SPECIALIZED TANKS

Metal-Glass San-I-Tanks give you safe, clean and rapid handling of any chemicals or liquids. These modern tanks are constructed throughout of 18-8 Stainless Steel making them immune to all acids and exceptionally easy to keep clean.

Tanks are finished with No. 4 polish on inside and bright finish outside. All Stainless Steel welded with inside welds ground smooth and polished.

San-I-Tanks incorporate special self-draining features with specially formed bottoms sloping to the front.

Built by tank specialists, San-I-Tanks incorporate every time saving, money saving feature. For years of trouble free service insist on San-I-Tanks.

MANY SIZES IN STOCK — READY FOR IMMEDIATE SHIPMENT

We endeavor to have a supply of stock sizes in San-I-Tanks on hand at all times. We have a tank for every application and in any size you need. Write us giving complete data on the size tank you need and we will, in many cases, have the tank in stock.

LET OUR ENGINEERS SOLVE YOUR SPECIAL TANK PROBLEMS

In addition to our complete line of stock sizes in San-I-Tanks which are stocked for immediate shipment, we also manufacture special sizes built to your requirements. If you have a special tank problem get in touch with us and our engineers will be glad to give you their suggestions. No obligation of course. It it's a tank problem we can solve it for you. Over 20 years of tank building experience backs the San-I-Tank so play safe and work with a tank specialist.

Write for Complete Literature and Prices

Metal-Glass Products Co.

Dept. FI. Belding, Michigan

Wash., which will be the site of the company's future plant expansion in the Pacific Northwest.

PERSONNEL

Dr. Frank Boyles has been named supervising chemist for the Joseph Burnett Co., Boston, manufacturers of food flavors and colors.

Ruth R. Clarke, has joined the staff of the American Institute of Baking as kitchen director. Testing and developing recipes using bakers products, both for home use and in quantities, has been the primary function of the test kitchen.

Lewis G. Dutton is the newly appointed vice-president and general manager of P. Duff & Sons, Inc., baking mix manufacturing division of American Home Foods, Inc., Pittsburgh. Howard H. McCully succeeds Mr. Dutton as assistant to H. W. Roden, President of American Home Foods.

Henry D. Egly has resigned as manager of the A. E. Staley Manufacturing Co., Richmond, O., to become president and managing director of Victoria Mills, Ltd., Toronto, Ont., a subsidiary of Canadian Breweries, Ltd.

Carl N. Lovegren has been elected president and general manager of the United States Products Corp., California canning firm. He was formerly head of Hunt Bros. Packing Co.

Thomas S. Olsen has been promoted from vice-president and treasurer to executive vice-president of General Baking Co., N. Y.

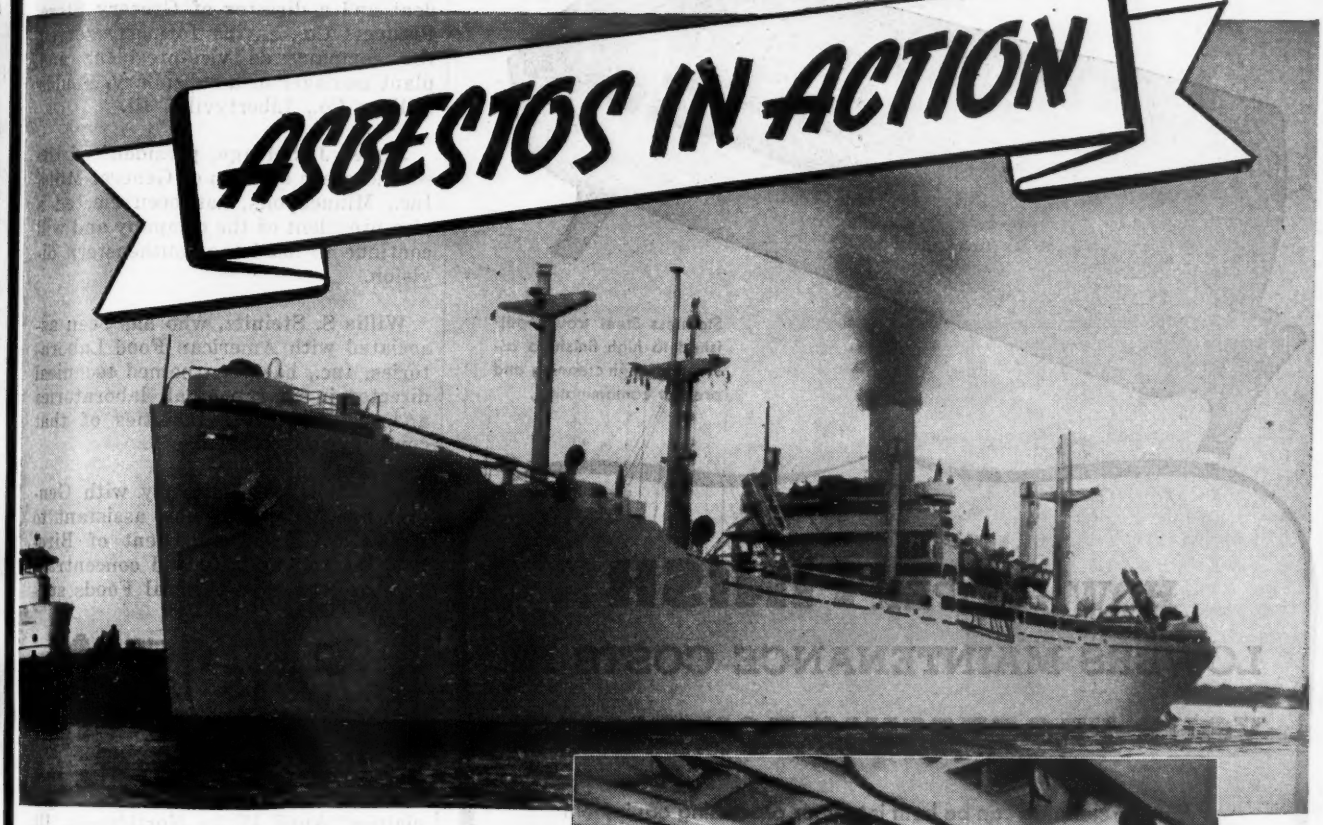
Lawrence F. Pratt, who has been in the technical research department of Continental Can Co., is now director of products control for Hunt Bros. Packing Co., Fullerton, Calif. R. V. Wilson succeeds Mr. Pratt at Continental.

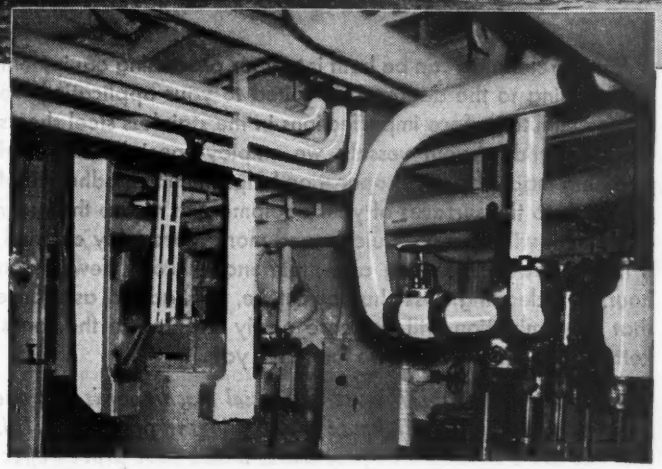
Henry D. Ross, for many years chief fruit buyer for J. M. Smucker Co., Orrville, O., has been named production manager of Keener Foods, Inc., Salem, O., recently purchased by the Smucker plant.

C. L. Rouse, formerly vice-president and sales manager of Schulze & Burch Biscuit Co., Chicago, has organized the Columbia Cookie and Cracker Co., Portland, Ore. George E. Vraney is associated with Mr. Rouse in the new enterprise.

Emil Rutz, of Schuckl & Co., Inc., is president of California Processors & Growers, Inc., for 1945. The association represents 38 fruit and vegetable canning companies, producing 85 percent of the state's pack.

ASBESTOS IN ACTION





Saving precious fuel and steam

K&M "FEATHERWEIGHT" 85% *Magnesia*

"Photo Courtesy Armstrong Cork Company"

Every intricate bend of the steam piping to pumps and apparatus in the engine room of this cargo vessel is tailored uniformly with K&M "Featherweight" 85% Magnesia. This widely used pipe covering combines the high insulating properties of basic Carbonate of Magnesia with strong Asbestos Fibres, and is designed for pipes carrying temperatures up to 600° F. It is extremely light in weight and it delivers maximum efficiency.

In one shipyard alone, 250 cargo vessels of the Liberty and faster 16 knot Victory type (pictured above) have been insulated by the skilled coverers of the Armstrong Cork Company, distributors of K&M "Featherweight" 85% Magnesia.

K&M "Featherweight" 85% Magnesia is giving this same kind of dependable service—these same heat and fuel savings—in power plants and industrial process plants all over the country. In fact, from the time 85% Magnesia Insulation was first developed by K&M more than sixty-five years ago, the name "Featherweight" has been a byword for quality with plant operating men.

ARMY E NAVY

K&M best in asbestos

YOUR MERCHANT MARINE SAVED US DURING WAR—LET IT SERVE YOU DURING PEACE

KEASBEY & MATTISON

COMPANY • AMBLER • PENNSYLVANIA

Stainless Steel trough polished to high finish to assure thorough cleaning and prevent contamination.

HOW PROPER **FINISH** LOWERS MAINTENANCE COSTS IN YOUR PROCESSING EQUIPMENT

● Ease of cleaning can be built into your processing equipment by polishing to the degree best suited to your application. To reduce minute surface imperfections in the stainless steel sheets used in building your vessels, we employ specially designed polishing machinery. This operation helps minimize adhesion of materials to the surfaces of your equipment. It means that your equipment will be more quickly and more thoroughly cleaned. It means lower operating and maintenance costs, fewer man hours for cleaning, less shutdown time. It is added assurance that contamination will be more easily avoided in the tanks, kettles, and other vessels we make for you.

Finish control through the use of special machinery is just one more way in which S. Blickman guards alloys in fabrication. It is just one more of the tested procedures which have proven effective in building equipment that operates more economically for you. For your next job, consult with us.

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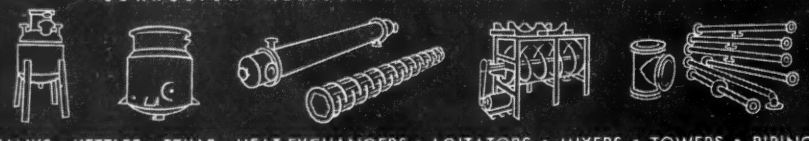
S. BLICKMAN, INC.
Guards Alloys in Fabrication

A request on your letterhead will bring our guide, "What to Look For When You Specify Stainless Steel for Your Processing Equipment."

CORROSION RESISTANT PROCESSING EQUIPMENT



TANKS • KETTLES • STILLS • HEAT EXCHANGERS • AGITATORS • MIXERS • TOWERS • PIPING

W. E. Roys was elected vice-president and a director of Grocery Store Products Co., having formerly served the company as vice-president and plant manager of a subsidiary, Foulds Milling Co., Libertyville, Ill.

James J. Selvage, president of the southeastern division of General Mills, Inc., Minneapolis, has been elected a vice-president of the company and will continue to head the southeastern division.

Willis S. Steinitz, who has been associated with American Food Laboratories, Inc., has been named technical director in charge of all laboratories and manufacturing facilities of that company in Brooklyn.

A. E. Stevens, formerly with General Foods Corp., is now assistant to Frank W. Birely, president of Birely's, Inc., citrus juice and concentrate processors, now a General Foods subsidiary.

DEATHS

Hugh E. Allen, 52, founder and president of Fearn Laboratories, Inc., Chicago manufacturers of food specialties, April 17, in Northbrook, Ill.

A. J. Amend, 87, former president of Wisconsin State Canners Co., Pickett, Wis., March 27.

John T. Appleby, 73, founder of Johnson-Appleby Co., Cambridge, Mass., March 31, Brookline, Mass.

Otto F. Bengs, 78, partner in the Fort Wayne Dairy Equipment Co., Fort Wayne, Ind., March 2.

H. A. Bittenbender, 57, director of the Animal and Poultry Nutrition Service Department of The Borden Co., March 7, at Bronxville, N. Y.

Frank M. Bremner, 53, a director and secretary of Bowman Dairy Co., recently, in Chicago.

Joseph S. Foster, 55, president of the Double Cola Co., Chattanooga, March 4.

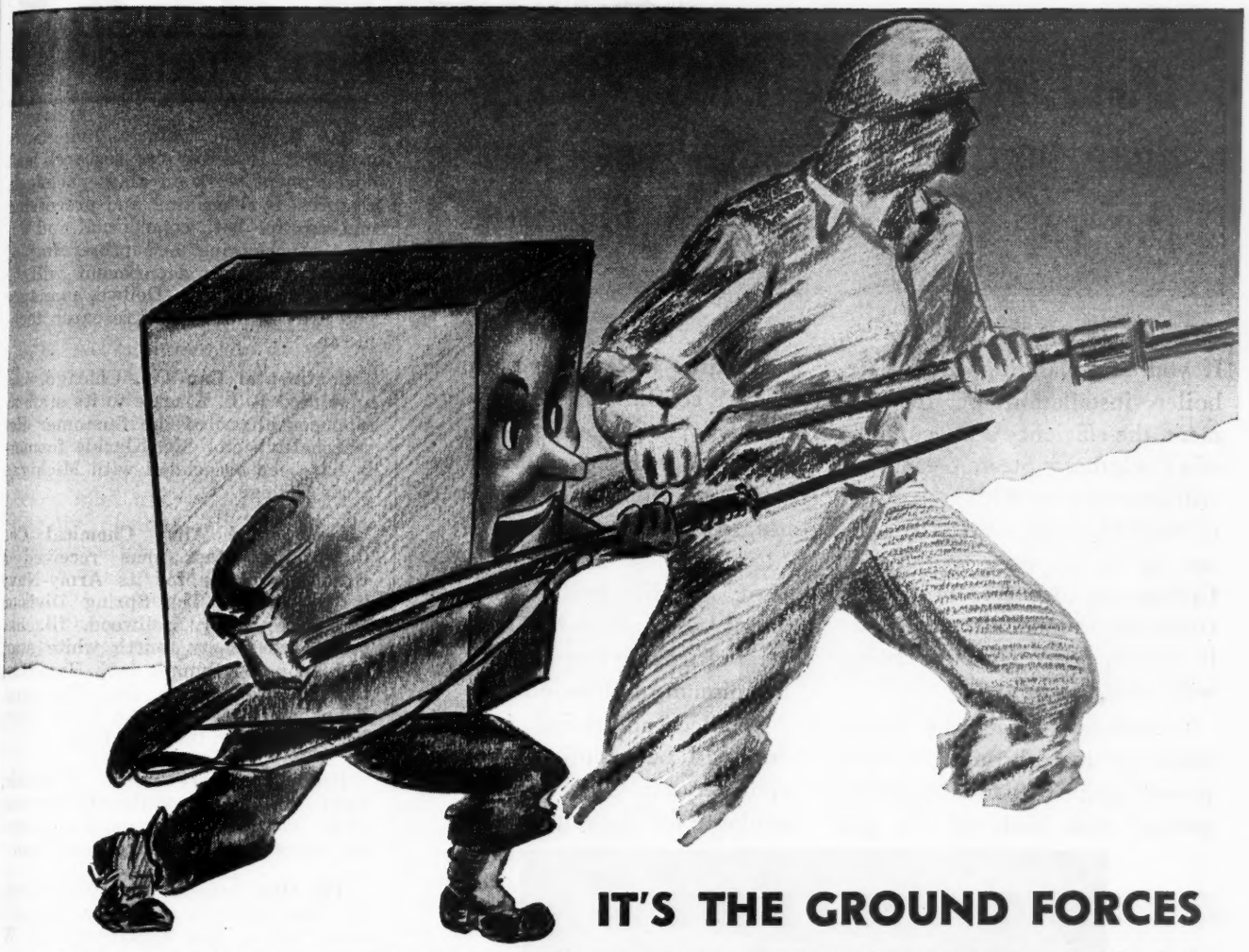
C. Edward Glynn, 66, retired president of Boston Molasses Co., April 13.

F. Langran Knight, 78, founder of Knight's Packing Co., Portland, Ore., March 7.

Albert Luer, 80, founder and chairman of the board of Luer Packing Co., Los Angeles, April 2.

Levi Phillips, 76, a founder of the Phillips Packing Co., Cambridge, Md., April 7, in Baltimore.

George H. Wood, 54, district manager of Anchor Packing Co., St. Louis.



IT'S THE GROUND FORCES THAT TAKE OVER TRADE TERRITORY, TOO!

After all the air force bombing and artillery shelling, it's the infantry that must mop up and take over territory gained. Likewise, after all your merchandising and advertising effort, it's the appeal of your packaged product to the ultimate consumer at the point of sale that wins and holds business.

The Rossotti organization has specialized for years in the selling tactics and merchandising strategy of packaging to overcome competition at the point of sale. Rossotti starts your packaging and labeling job with a thorough "reconnaisance" of competing "objectives" to be gained—a thorough survey and comprehensive analysis of marketing factors. Your package is built on this well-mapped and detailed plan—to compete sucessfully with rival products on your dealers' shelves.

Rossotti Packaging Consultants are experienced and thoroughly equipped. There is even a modern kitchen to study nutritional and other selling points. We grind our own colors and control weather for best printing results. May not these unusual services help you win additional trade territory?

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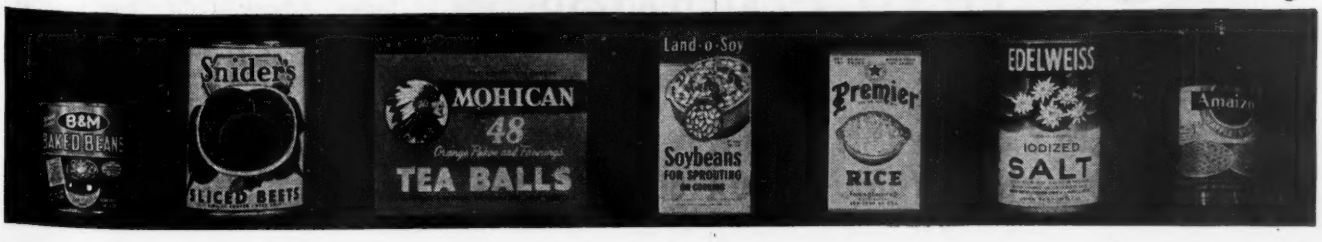
SOUTHEASTERN OFFICE: 1106 Barnett National Bank Bldg., Jacksonville 2, Fla.
MID-WEST DIVISION: ROSSOTTI MID-WEST LITHOGRAPHING CORP., 520 N. Michigan Avenue, Chicago 11, Ill.
WEST COAST DIVISION: ROSSOTTI WEST COAST LITHOGRAPHING CORP., 255 California Street, San Francisco 11, Cal.



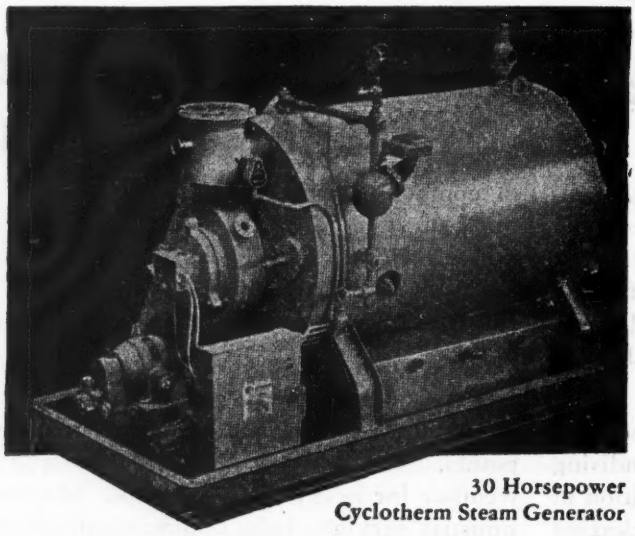
DOLLAR EFFICIENCY—work done per dollar spent—measures the value of steam generation

If you are planning immediate boiler installation or replacement, the efficiency and economy of a Cyclotherm Steam Generator will interest you. While the range of available units obviously cannot be on a peace time basis, Cyclotherm engineers will gladly cooperate in meeting your needs in power, processing or heating with available units.

Cyclotherm meets the dollar efficiency test through a wide power range (10 to 300 horsepower) with both oil and gas fired units. Its exclusive principles of combustion and design have proved Cyclotherm's dollar saving and dollar making capacity under most rigorous operating conditions.

Cyclotherms are fully automatic, sturdily built and completely self contained. They give years of trouble free service with a minimum of attention.

Detailed additional information will be supplied promptly upon request. Our engineers are available for consultation.



30 Horsepower
Cyclotherm Steam Generator

CYCLOTHERM
STEAM GENERATOR

AMES IRON WORKS
OSWEGO . . NEW YORK . . BOX 601

ASSOCIATED INDUSTRIES

Ball Bros. Co., Muncie, Indiana, is preparing facilities for research and development work on glass packages, closures, food packing and processing methods for both commercial and domestic packaging and preserving of foods. The new department will be headed by Fred H. Dellwo, manager and Karl L. Ford, chief research technician.

Continental Can Co., Chicago, has appointed R. L. Klackle to its staff as crop consultant of the Customer Research Division. Mr. Klackle formerly has been associated with Michigan State College.

Dewey and Almy Chemical Co., Cambridge, Mass., has received a third white star for its Army-Navy "E" pennant. The Spring Division of Borg-Warner, Bellwood, Ill. has been awarded its fourth white star, and Economy Pumps, Inc., Hamilton, O., and Dobeckmun Co., Cleveland, have been presented the Army-Navy "E" award for the first time.

Food Machinery Corp., Riverside, Calif., has announced the appointment of E. A. Verrinder as chief engineer. He succeeds G. C. Paxton, retired.

The Ohio Injector Co., Wadsworth, O., manufacturers of bronze, iron and steel valves, has appointed Joe W. Greene general sales manager.

Owens-Illinois Glass Co., Toledo, has named William M. Beckler assistant general sales manager of the Libbey glass division. He has been sales manager of the hotel and restaurant branch of the division for the past four years.

Thomas Phillips Co., Akron, has announced the appointment of Burton Ford as a director and general manager. He was formerly sales manager for the valve bag division of St. Regis Paper Co.

Dr. W. B. Pings, organic chemist, has recently joined the staff of Arthur D. Little, Inc., Cambridge, Mass., industrial research organization. Dr. Pings was previously at the experimental station of E. I. du Pont de Nemours & Co., Wilmington, Del.

A. L. Pitman, formerly in charge of the chemical engineering section, Western Regional Research Laboratories, Albany, Calif., has been appointed to the packaging research department of food technology of the Reynolds Metals Co.

Seiberling Rubber Co., Akron, has announced the promotion of L. M. Seiberling to sales manager in charge of manufacturers' and government sales.

FOOD EQUIPMENT NEWS

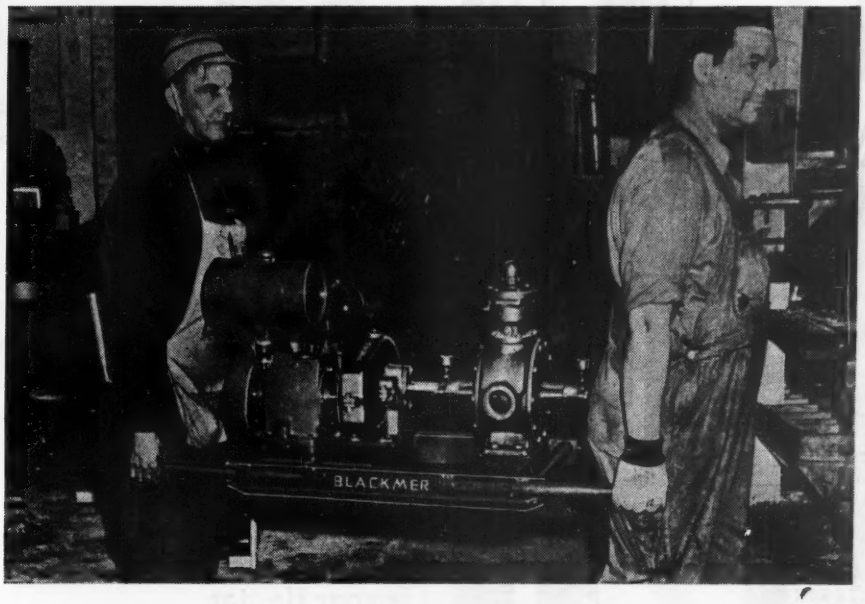
Continuous Steam Peeler

A CONTINUOUS steam peeler for root vegetables is announced by Food Machinery Corp., San Jose, Calif. The unit consist of a cylinder 12 ft. long and 14 in. in diameter. It is equipped with a ten-flight worm conveyor, inlet and outlet valves, and a variable-speed drive. Timed to the inlet valve also are an elevator and a lubricator, the combined units being driven by a 3-hp. motor. The rotary seven-pocket inlet and outlet valves are specially designed for high-pressure operation.

Each inlet valve pocket delivers 6 lb. of potatoes into the cylinder, where the potatoes are pushed forward by the worm conveyor. Steam pressure of about 60 lb. per square inch is maintained in the cylinder. Upon leaving the steam chamber, each valve pocket is filled with high pressure steam, and if the valve opened to atmosphere, the steam would be expelled noisily. And there would be an approximate loss of 250 lb. of steam per hour from the inlet and outlet valves when operating at 55 lb. pressure and 9 r.p.m. But connections for diversion of this steam to useful purposes are located on the sides of each valve, these connections also eliminating the noise. The valves are so timed that the flow of steam alternates, thus giving a more or less continuous flow through the relief lines.

The manufacturer states that peel may be removed from the steamed potatoes by abrasion peelers equipped with nearly smooth rollers, or with rubber rollers. Peel removal also can be effected by a brusher operating in conjunction with a water spray, or simply by the use of high-pressure water sprays.

The maximum steam consumption of the steamer is placed at 900 lb. per hour. With a steaming time of 30 seconds (valve speed, 4½ r.p.m.), steam consumption is said to be approximately 775 lb. per hour. On this basis, the peeler can handle 113 bags of potatoes per hour.

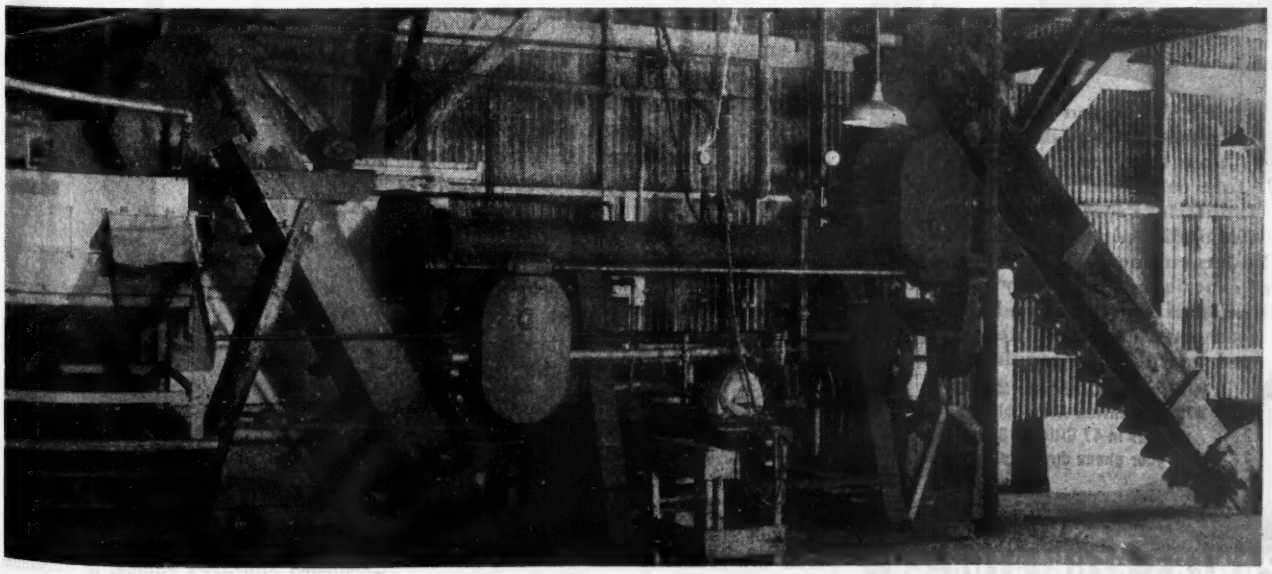


Portable pumping unit.

The unit requires a floor space of approximately 5 x 27 ft., stands 11 ft. high and weighs 6,300 lb.

Portable Pumping Unit

BLACKMER PUMP Co., Grand Rapids 9, Mich., has developed a self-contained rotary pumping unit powered by a gasoline engine. The unit consists of a 90 g.p.m. bronze-fitted standard pump with built-in chatter-proof relief valve, oil immersed drive and 2 h.p. engine, all mounted on a fabricated steel base which is fitted with telescopic handles for convenience in moving. The complete unit weighs 330 lb.



Continuous steam peeler.

POWERS
TEMPERATURE and HUMIDITY
CONTROL

When you want accurate and dependable automatic temperature or humidity control for Industrial Processes, Heating or Air Conditioning Systems, call in a Powers engineer. With over 50 years of experience and a very complete line of self-operating and air operated controls we are well equipped to fill your requirements.

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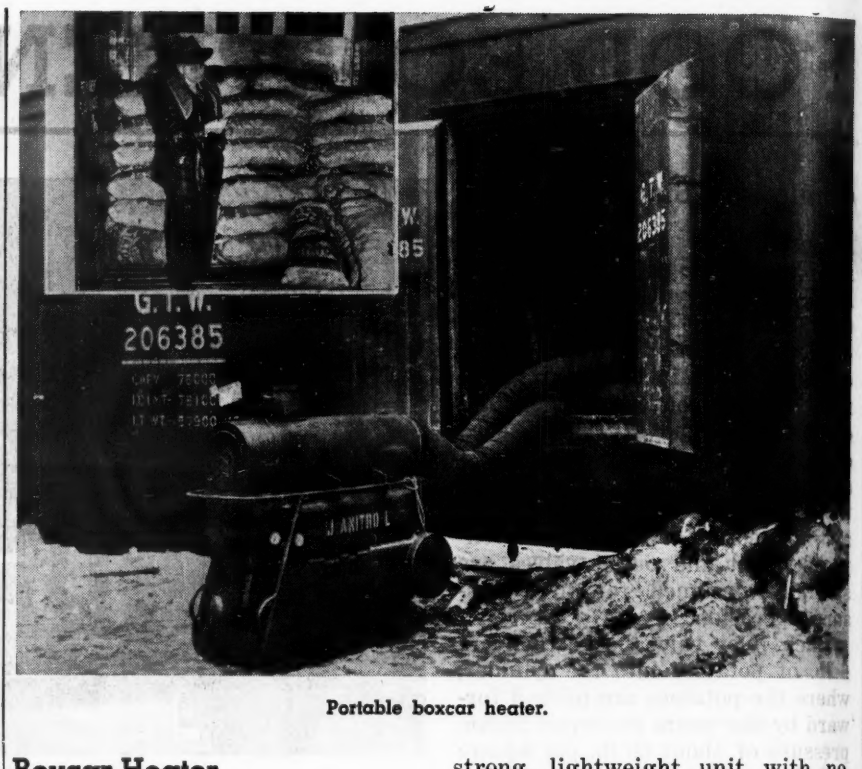
Offices in 47 Cities—See your phone directory.

THE
POWERS REGULATOR CO.



Portable boxcar heater.

Boxcar Heater

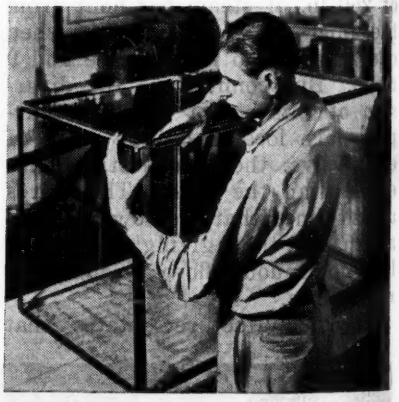
ORIGINALLY developed to preheat airplane engines and cabins at Arctic bases is a portable heater which can burn gasoline, kerosene, light oil or diesel oil. It has a heat rise of 230 deg. and has a B.t.u. output sufficient to warm four average-sized homes. This portable heater is now used to heat cars for transporting perishable foods such as potatoes. It is said that the temperature of the potatoes in the car is raised 1 deg. and the car temperature 20 deg. within 10 minutes. This heater was designed by Surface Combustion, Toledo, Ohio.

Snap-assembly Structure

STRUC-LOK, a prefabricated light metal structure, based on a method of snap assembly requiring no bolts, screws, rivets or welds, has been announced by Lindsay & Lindsay, 222 W. Adams St., Chicago 6. Made of aluminum or steel, the structure consists of three basic parts: framing, sheets and fittings. All parts are accurately die-formed by mass production methods in a wide variety of sizes. Assembly is said to be easily handled by men or women without special training, as all of the parts are snapped together by hand.

Special fittings hold the framing together, while the flanged edges of the sheets are snapped into die-rolled frame channels. As the edges of the sheet snap into place, they lock the framing and sheets permanently into position, providing strong, lightweight unit with no space sacrificed for reinforcing braces.

The structures are available with sheets in 26- and 24-gage steel and 0.20- to 0.30-in. 61 ST aluminum alloy. Perforated or expanded



Special fittings connect framing and hold it together while sheets are installed.

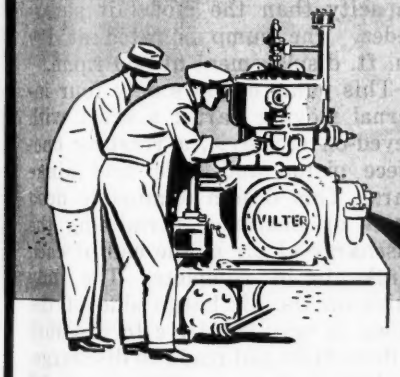
Completed Struc-Lock cabinet in aluminum weighs only 24 lb.

When new equipment becomes available

Cut Your Power Costs

with this Vilter Booster Compressor

When you hold down power costs by combining your present equipment with this booster ammonia compressor, power savings vary from 10% to 20%—and the system will outlast a simple compression system under the same conditions. The booster compressor illustrated (size 9½" x 7½") is equipped with manually controlled clearance pockets, permitting a capacity variation of as much as 50%.



...and now

insure this summer's production

by having the Vilter organization *Check* your refrigeration equipment

With new refrigeration equipment scarce or unobtainable, it pays to take care of your present equipment — not only by way of routine maintenance, but through a careful over-all check-up.

Vilter's experienced engineering organization is available to help you make a complete survey of your refrigeration requirements and the condition of your refrigerating equipment. Without obligation, a Vilter engineer will gladly go over your entire system, suggesting steps which can be taken now to avoid trouble this season, and noting improvements which you may want to make later when the opportunity is offered.

It is not too soon to begin planning for lower refrigerating costs through replacements of or additions to your present equipment — or even to place a "postwar order" which will insure the earliest possible delivery when new equipment again becomes available.

The Vilter name has stood for sound engineering and quality construction since the beginning of the refrigeration industry, away back in 1867. You can depend on the advice you get from the nearest Vilter engineer. Call on him. Also ask for bulletin 935. Address the nearest Vilter branch, distributor, or: *The Vilter Manufacturing Co., Department E-15, Milwaukee 7, Wisconsin.*

Branch Offices and Distributors in Principal Cities

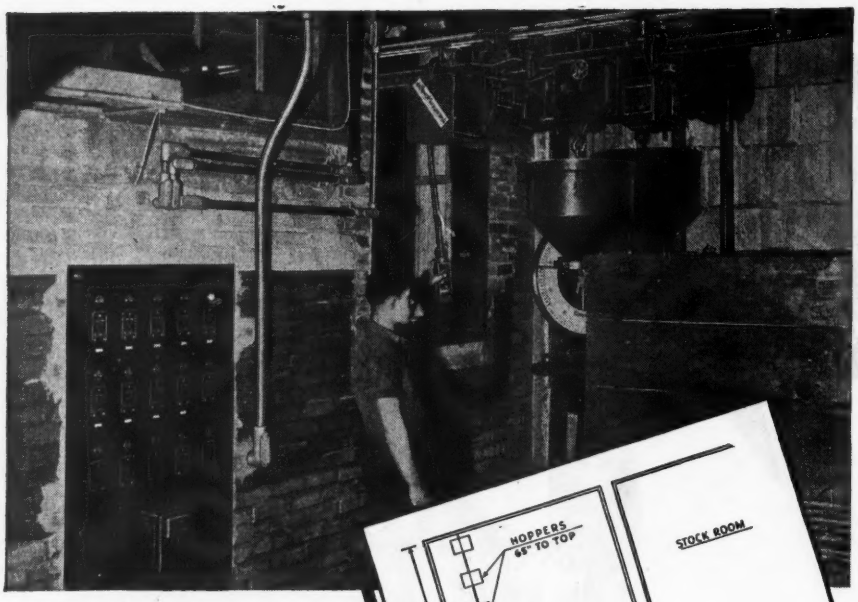
Superior Since 1867

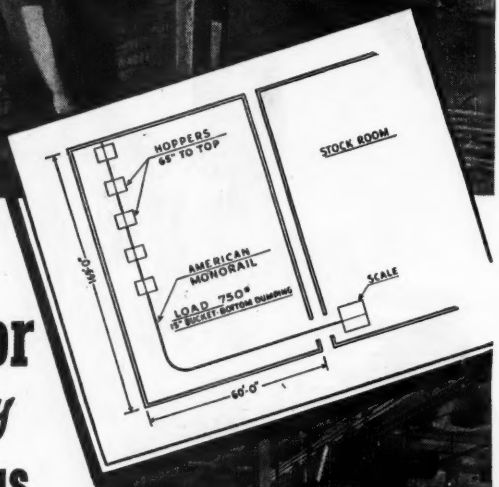
VILTER

Air Conditioning Refrigeration...

ARMY E NAVY

M-3

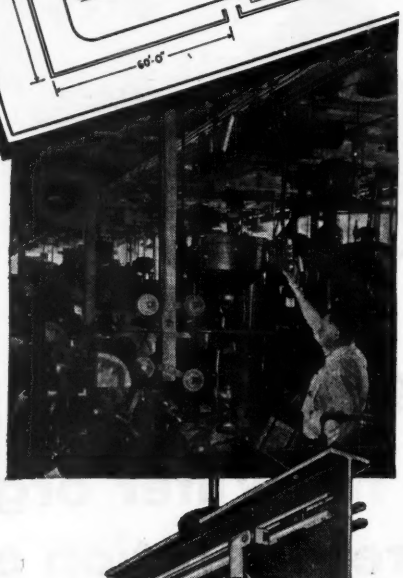


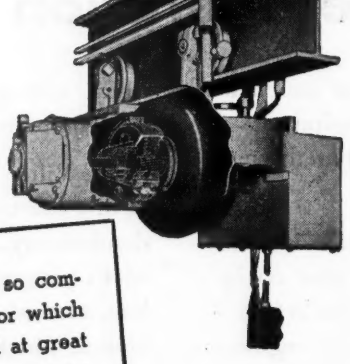


American MonoTractor *Automatically* FEEDS 15 STATIONS

Here is an American MonoRail System that is almost human. By remote control, semi-precious metal is delivered to fifteen tube - forming machines.

After dispatcher fills container with slugs he carefully check-weighs the load and dispatches it to one of the 15 machines. Operator at machine where carrier stops automatically unloads the metal slugs by push-button control and returns carrier to central station. All handling operations are performed through signal lights and push-button switches.





American MonoRail Systems are not all so complicated. But all do the handling job for which they are designed— better, quicker and at great saving in cost. An American MonoRail engineer will gladly tell you how it will work in your plant.

THE AMERICAN MONORAIL CO.

13125 ATHENS AVE. CLEVELAND, 7, OHIO

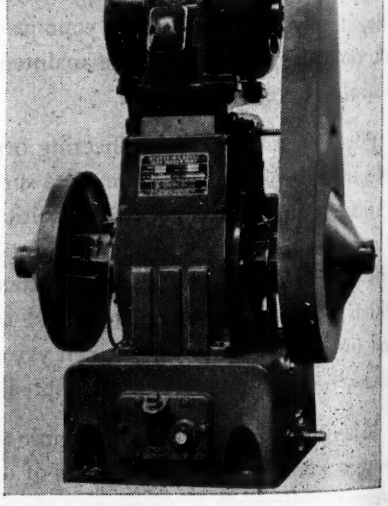
metal sheets also may be used. Openings, louvers, doors and other conventional construction details are easily incorporated and provision is made for using the framing to support shelving, hooks, machines or other equipment. Corner caps and decorative molding, which also snape easily and permanently into place, give the complete unit an attractive, machine-finished appearance.

High-vacuum Pump

A PUMP designed to produce and maintain vacuum as low as five microns absolute pressure in continuous service, is being marketed by F. J. Stokes Machine Co., Philadelphia 20. It is an oil-sealed rotary type, and is smaller, lighter in weight, simpler in design, more rugged and has both higher volumetric efficiency and greater capacity than the model it supersedes. The pump is rated at 100 cu. ft. displacement at 350 r.p.m.

This pump employs only four internal moving parts: a shaft with keyed-on eccentric, a rotating one-piece piston and slide, and hinge bars. This design eliminates dead space or clearance, permitting the discharge of air at the end of each stroke to be complete. The only valve on the discharge side of the pump is very sensitive to pressure differentials and made to discharge, without injury, sudden slugs of water or other liquids that may be sucked into the pump. The valve seat, of stainless steel, is readily accessible and replaceable.

The pump is direct motor driven (with a V-belt), the motor being mounted on an adjustable hinged base. Its pulley is carefully bal-



High-vacuum pump.

ANNUAL PRODUCTION OVER 34 BILLION POUNDS OF PAPER

WHY PAPER IS S-C-A-R-C-E

Paper mills are being pushed to the limit of their productive capacity... more than 34 *billion* pounds a year... yet paper is harder to get than ever before.

Of course, "It's the war." We know that, and we know you do, too... but instead of talking generalities, we would like to tell you exactly where all this paper is going.

After Uncle Sam and our essential industries have ordered what they need, there is only about one pound in four left for everybody else put together. Under such circumstances, "non-essential" customers must do the best they can, with what they can get, when they can get it.

It's hard on you, and it's hard on us... and "V-E" Day won't solve the problem. But when the Final Victory is won, we know that American business and industry will do as fine a job in peace-time production as it has in time of war... and that Riegel Papers will again meet all requirements efficiently, quickly and economically.

29.5%
TO GOV'T F. E. A. and DEFENSE PLANTS

43.7%
TO ESSENTIAL WAR ACTIVITIES
• FOOD
• DRUGS
• PUBLIC SERVICE
• COMMUNICATIONS
• CONSTRUCTION

26.8%
ALL OTHER USERS
•

Credit is given to the American Paper & Pulp Association for their assistance in supplying this data. Annual production based on last 12 months. Breakdown of usage based on pulp allotions for 1st quarter, 1945.

RIEGEL PAPERS

RIEGEL PAPER CORPORATION

342 MADISON AVENUE • NEW YORK 17, N.Y.

139

Food is VITAL!

Reduce waste with *Beckman* pH Control

Among the many ways that Beckman pH Control is cutting lost time, saving money and reducing waste in food operations is its application to increasing the effectiveness of bottle washing, sterilizing of processing equipment, etc. The increasing re-use of bottles to conserve glass and metal supplies, coupled with the greater-than-ever need for safeguarding public health, makes this Beckman application particularly timely . . .

pH APPLICATIONS

BAKING • BOTTLE WASHING • BREWING • CANNING • CARBONATED BEVERAGES • CASEIN PRODUCTS • CHEESE MAKING • FOOD LABORATORIES • FRUIT JUICES • GELATIN PRODUCTS • JELLY MAKING • MALTING • PHARMACEUTICALS • SALAD DRESSING • SUGAR REFINING • VITAMIN PRODUCTS

STERILIZING

Bacteria are very sensitive to changes in pH, thriving in an environment of neutral pH and becoming decreasingly active as the pH is lowered. By utilizing this fact a more complete "kill" of micro-organisms can be obtained by performing the washing and sterilizing operations at a low pH. A low pH (4 or under) is particularly important when using the detergents and similar cleansing agents so widely employed today, as well as with standard soap solutions.

Without accurate pH control sterilization may be incomplete and haphazard. But with it, a more uniform and completely effective germ "kill" can be maintained at all times. Spoilage and waste are minimized. Quality and flavor are safeguarded. And public health is protected!

Beckman Industrial pH Meter

BECKMAN is the *only* modern pH equipment that can be used in boiling hot process solutions (invaluable in sugar refining and other food processes) . . . and in highly alkaline solutions, even in the presence of sodium ions. It is the *only* modern pH equipment providing rugged glass electrodes that will withstand direct pressures to 100 pounds . . . and the *only* glass electrode equipment offering automatic six-station pH control. These are only a few of *many* vital Beckman advancements. There is a size and type Beckman pH Instrument for every food processing application, large or small. Send for detailed literature!

FREE! *What Every Executive Should Know About pH—a booklet of helpful informative facts on modern pH control and its applications. Send for your copy today!*

BECKMAN INSTRUMENTS
NATIONAL TECHNICAL LABORATORIES
South Pasadena California

BECKMAN INSTRUMENTS CONTROL MODERN INDUSTRIES

anced to act as a flywheel and assure smooth operation. Oil baffles are built into the base to remove entrained oil from the exhaust.

Mashing, Mixing Tub

SHOCK, GUSMER & CO., INC., Hoboken N. J. is introducing a double-spiral horizontal mashing and mixing tub. Outside helical mixing blades carry the material forward, while inside helical blades work in the opposite direction. The manufacturer states that the material is thrown upward, downward and sideways, so that thorough mixing is obtained. No portion of the material can lie dormant while the machine is in operation. The mixer tub can be equipped with a steam jacket, or heated with live-steam nozzles. It is also possible to design the tub for internal pressure cooking. The tub can be furnished in steel, copper, stainless steel, and nickel- or stainless-clad steel.

MATERIALS

Wetting Agent

ALCONOX is the name of a new wetting agent produced by Standard Scientific Supply Corp., 34 W. 4th St., New York, N. Y. This detergent is said to leave no surface film or streaks and to require no toweling or polishing; simple rinsing leaves the surface sparkling clean. Its penetrating effectiveness is based on lowering the surface tension of foreign matter adhering to the surface. It is said to have no effect on the vessel itself whether it is glass, porcelain or metal. The material is packed in dry form and is available in 3-lb. packages as well as in bulk.

Long-life Packings

FLAX PACKINGS are now made by a new process said to keep the flax soft and pliable for long periods. Greene, Tweed & Co., Bronx Blvd. at 238th St., New York 66, states that the difference between the new flax packings and the old is in the method of impregnating the flax fibers with tallow which provides subsequent lubrication. In the former method the custom was to plait the flax while dry and immerse the finished packing in the hot tallow. In the new method each strand of the flax is put through a machine, which forces hot tallow into the structure of the flax. These thoroughly impregnated strands are then plaited into packing form.

CATALOGS, BULLETINS

FOOD PLANT EQUIPMENT

Blowers and Gas Pumps—Typical installations of positive rotary blowers and gas pumps are pictured in 4-page bulletin No. G-81-D, issued by Roots-Connersville Blower Corp., Connersville, Ind.

Food Processing Equipment — Catalog 45 has just been issued by Chisholm Ryder Co., Inc., Niagara Falls, N. Y. It covers a comprehensive list of equipment for the food processor in its 166 pages. Illustrated with actual photographs of the equipment, the catalog gives considerable engineering data as well as descriptions of the equipment illustrated.

Unscrambling Table — Island Equipment Corp., 101 Park Ave., New York 17, N. Y., has a 4-page folder describing their improved unscrambling table for glass jars.

Stoker—Illustrated with photographs and drawings, a new 8-page bulletin issued by the American Engineering Co., Philadelphia 25, Pa., describes an automatic stoker with variable feed. It has uniform overthrow spreading, and is said to burn all kinds and grades of solid fuels, wet or dry.

Centrifugal Pumps — Single-suction pedestal-type centrifugal pumps are described in a bulletin of Allis-Chalmers Mfg. Co., Milwaukee 1. Included are cross-section drawings of the various pedestal types and standard specifications, which are based on the standard construction "cast iron bronze fitted" pumps. Dimensions are illustrated and tabulated.

Batch Mixers—An illustrated bulletin that describes batch mixers with beaters and whips for whipping cream, mixing batters, mixing fruit juices, and similar items, has just been issued by Reynolds Electric Co., 2650 W. Congress St., Chicago 12.

Open Feed Water Heater—Treating open feed water heaters of various types is described in bulletin No. 4091 issued by Cochrane Corp., 17th St. and Allegheny Ave., Philadelphia 32. Different types of tray heaters, jet heaters, V-notch metering heaters, and convertible tray type heaters are illustrated and described.

Coal Crushers—Jeffrey Mfg. Co., Columbus 16, Ohio, has a 40-page catalog No. 784, covering its complete line of crushing equipment for industrial users of coal. This informative piece shows types, sizes, capacities, space required and the complete range of product sizes.

Immersion Tank Heater—Brown Fintube Co., 160 Filbert St., Elyria, Ohio, has just issued bulletin No. 451, describing a new steam tank heater that speeds the unloading of materials where viscosity can be lowered by heating.

Stoneware—Bulletin No. 405, issued by U. S. Stoneware Co., Akron 9, Ohio, now is available. Its 8 pages illustrate various types of chemical stoneware, including cylindrical pots, tapered pots and rectangular tanks.

Clear Liquid Pump—Economy Pumps, Inc., Hamilton, O., has just issued catalog D2-1042 describing and illustrating their full line of pumps for clear liquid service, ranging from 10 to 500 g.p.m.

PLANT SUPPLIES

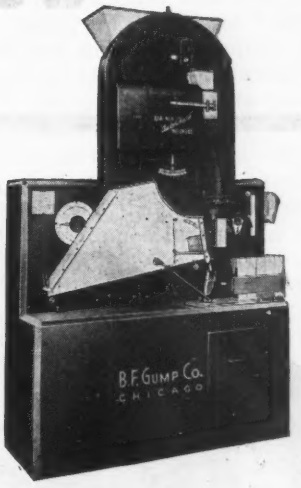
Synthetic Rubber Belting—A recent bulletin issued by the B. F. Goodrich Co., Akron, Ohio, describes a new synthetic rubber belting. It states that the new synthetic rubber belting will not absorb the dressing as quickly as natural rubber and care must be taken not to apply more than necessary, as this may result in slippage. Use of dressing permits the belt to produce greater horsepower and to operate under a load with less tension than a belt without dressing.

Electrical Supplies—Walker-Jimieson, 311 S. Western Ave., Chicago, has just issued a 40-page attractively printed booklet, listing numerous electrical equipment and supply items. Among them are industrial sound systems, electrical maintenance supplies, timers, relays, transformers, condensers, fluorescent lamps and tool-room equipment.

Flashlight Charger—B. F. Goodrich Co., Akron, Ohio, has issued a bulletin describing its equipment for charging wet flashlight batteries. Illustrations show how the charger may be attached to the ignition system of automotive vehicles.

Paint Selector—Selection of the best paint for a given application, without detailed technical knowledge, is made easy by the Valdura Paint Guide, offered to industrial maintenance engineers by American-Marietta Co., 43 East Ohio St., Chicago. The guide is of convenient pocket size and works on the principle of a slide rule with only two settings. It designates the correct surface preparation, the proper priming and finishing coats, and the type and proportion of thinner. Coverage and drying-time data also are furnished.

BAR-NUN "Auto-Check" WEIGHER



Automatically

- WEIGHS MATERIAL!
- FEEDS BAGS!
- OPENS BAGS!
- FILLS BAGS!
- EJECTS BAGS!

THE only thing left for an operator to do is close the bags! Made in two models, one for small 3 and 4 ounce bags and the other for one-half and one pound bags. Efficiently handles dry powdered, granulated, or flaked materials with speed up to 33 square bottom bags per minute. Furnished complete with fractional horsepower motors, drive and starting switches. Tell us about your bag packaging needs. If this equipment is suitable for your use, we'll gladly plan and recommend the most efficient installation for you.

MADE BY:

B. F. Gump Co.

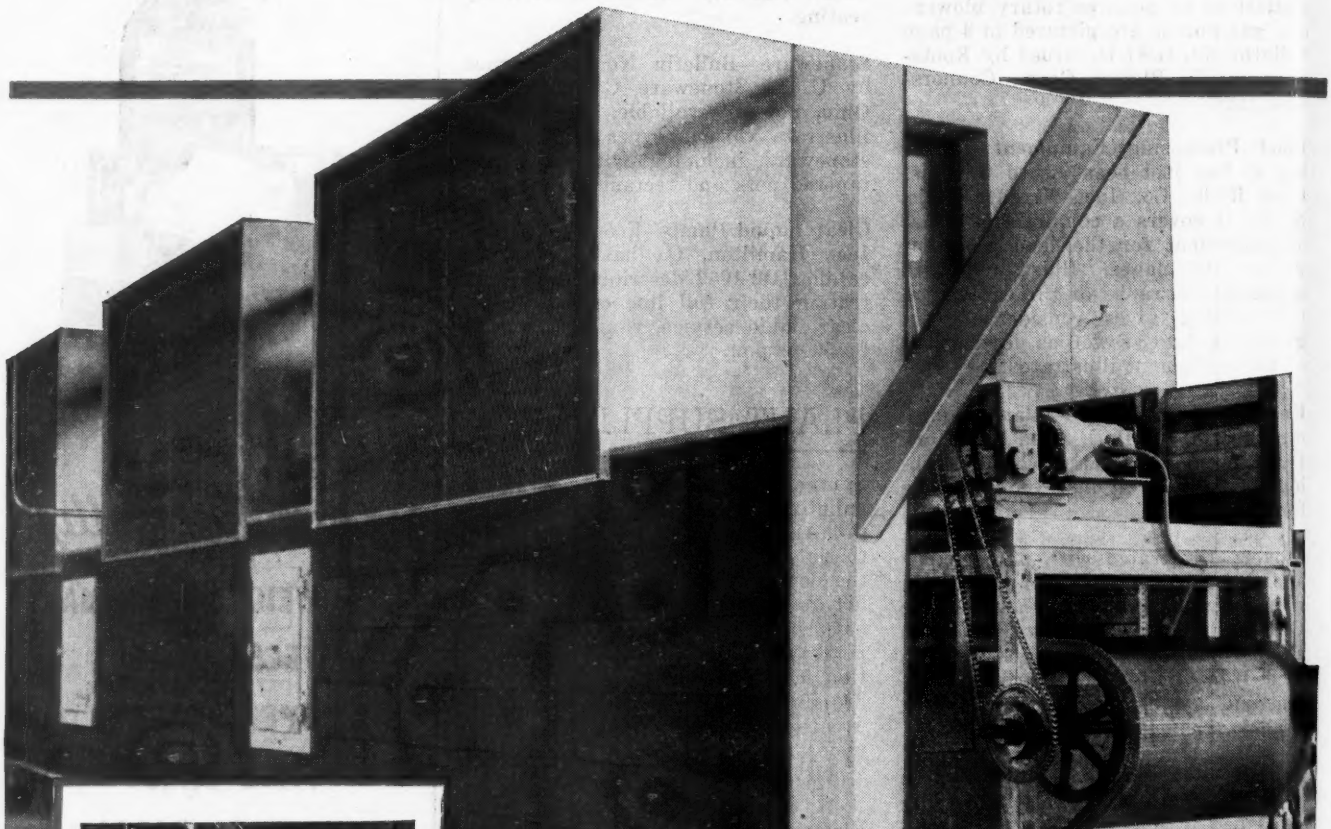
Established 1872

454 SO. CLINTON STREET
CHICAGO 7, ILL.

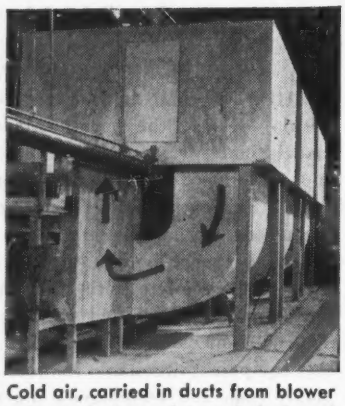
MAKERS OF: Equipment for Grinding, Mixing, Feeding, Sifting, Weighing or Packing of Dry Food Products.

★

20° F. below zero tunnel works without waste



Freezing tunnel and overhead blower units in the plant of the Concord Corp., Cairo, Ga. Picture shows Armstrong's Corkboard Insulation, 8 inches thick, before portland cement plaster finish was applied.



Cold air, carried in ducts from blower units to bottom of tunnel, is forced up through the stainless steel mesh belt, cooling or freezing the vegetables, and returned to the blowers. The refrigerant line is insulated with special thick brine cork covering.

Warm Air Constantly Enters this freezing tunnel along with the vegetables being cooled or frozen. But efficient insulation of the entire unit helps to assure economical maintenance of temperatures down to 20° F. below zero. For not only the tunnel itself, but the three refrigerating and fan chambers, and the three cold air ducts, are insulated with Armstrong's Corkboard. This effective heat barrier permits close control of temperatures and reduces refrigeration costs.

If you have a new or unusual problem involving insulation, Armstrong's engineers, with more than 40 years' experience in this field, will gladly help in its solution. For full information, write to Armstrong Cork Co., Building Materials Division, 4205 Concord St., Lancaster, Penna.

ARMSTRONG'S INDUSTRIAL INSULATION

Complete Contract Service For All Temperatures

From 300° Below Zero

To 2600° Fahrenheit

QUESTIONS & ANSWERS

Onion Juice

Western New York—We are considering the idea of packing onion juice for use as seasoning. Do you have any information on the preparation and processing of such a product?

There is very little published material on the preparation and processing of onion juice. This is a virgin field and might therefore prove very fruitful to anyone that accepts the challenge.

It has been reported that raw onion juice, not even blanched, if made from good sound stock and packed in glass, stoneware or paraffin-lined wooden barrels will keep for a considerable time. The proper selection of good sound stock and care and cleanliness in its preparation, are the only requirements.

If the juice is to be canned, to be kept for an extended period of time, it will have to be processed under pressure. This would raise havoc with the flavor. If the pH of the juice were reduced to 4.4 or less by the addition of citric acid, the canned product would keep satisfactorily by processing it in boiling water, thus avoiding the higher temperatures involved and the consequent flavor destruction at elevated temperatures.

Another method that can be used is extracting with ethyl alcohol. This method is briefly as follows: To about 2 lb. of peeled and macerated fresh onions is added about 5 lb. of ethyl alcohol. The mixture is allowed to stand for about three days. At the end of this time, about 4 lb. of liquid is extracted into a muslin bag. Such an alcoholic extraction is stable.

Another method that can be used is the distillation process. This method is briefly as follows: To macerated raw onions is added a small quantity of a stable oil, such as corn, cottonseed or olive oil. The mixture is heated in a still to from 120 to 220 deg. F., recovering the distillate in the condensing chamber. The condensate may be fractionated to suit one's own preference. Testing the various fractions coming over, yielding various flavor segments of the onions, will reveal the particular combination best suited to one's taste. The condensate contains the volatile flavoring materials of the onions, together with about 1 percent of the added oil, which is sufficient to stabilize the distillate.

The freezing of onion juice might prove to be a fertile field for the preservation of this product.

Glace Fruits

London, England—We are interested in securing directions for producing glacé cherries.

The manufacture of glacé cherries is a tedious hand operation. The general procedure is to immerse the cherries into a cold sugar solution, allow them to remain generally overnight, during which time part of the moisture is removed from the cherries and is replaced by the sirup by osmosis. The diluted sirup is then poured off, placed in a steam jacketed kettle, and is concentrated, cooled, strengthened and placed on the cherries again. The process is repeated until a consistency of 72 deg. Balling is attained.

All of the foregoing procedure is for the purpose of impregnating the fruit with sugar. It is usually done in "dish pans" of 4- or 5-gal. capacity. The steam-jacketed kettle has a capacity of 100 to 150 gal. While workers are pouring off thinned sirup from the pans, the reclaimed sirup is being strengthened by 10 deg. Balling intervals.

The starting sirup is made up originally of 1 lb. of dextrose—or invert sugar—1 lb. of cane sugar and enough water (about 2 lb.) to make a 30-deg. Balling solution.

Some operators prefer to bring the fruit and the original sirup to a boil and set aside for the osmotic process to proceed. Boiling is done to prevent fermentation.

The fruit is to remain in the sirup for at least three weeks. The fruit is then removed from the sirup, and is quickly dipped in and out in a sieve in boiling water to remove surface sirup only. The fruit is then placed on a screen and into a dryer at a temperature of about 120 deg. F.

From this point there are two ways to proceed:

a. To make a *sirup* glacé, mix by weight two parts of cane sugar, one part of corn sirup and two parts of water. Cook to 238 deg. F. Cool to 200 deg. F. Dip above prepared fruit into it in a wire sieve and drain. Dry at 120 deg.; cool.

b. A *pectin* glacé can be made of 1½ percent pectin solution. Dip above prepared fruit into this solution, dry at 120 deg. F., and cool.

AN IMPORTANT MESSAGE TO PLANT MANAGEMENT

Regarding Control of

Skin Irritations

TARBONIS is effective in both preventing and clearing up skin irritations resulting from the handling of a wide variety of foodstuffs—too long immersion of hands in brine—constant contact with acid-type foods, etc.

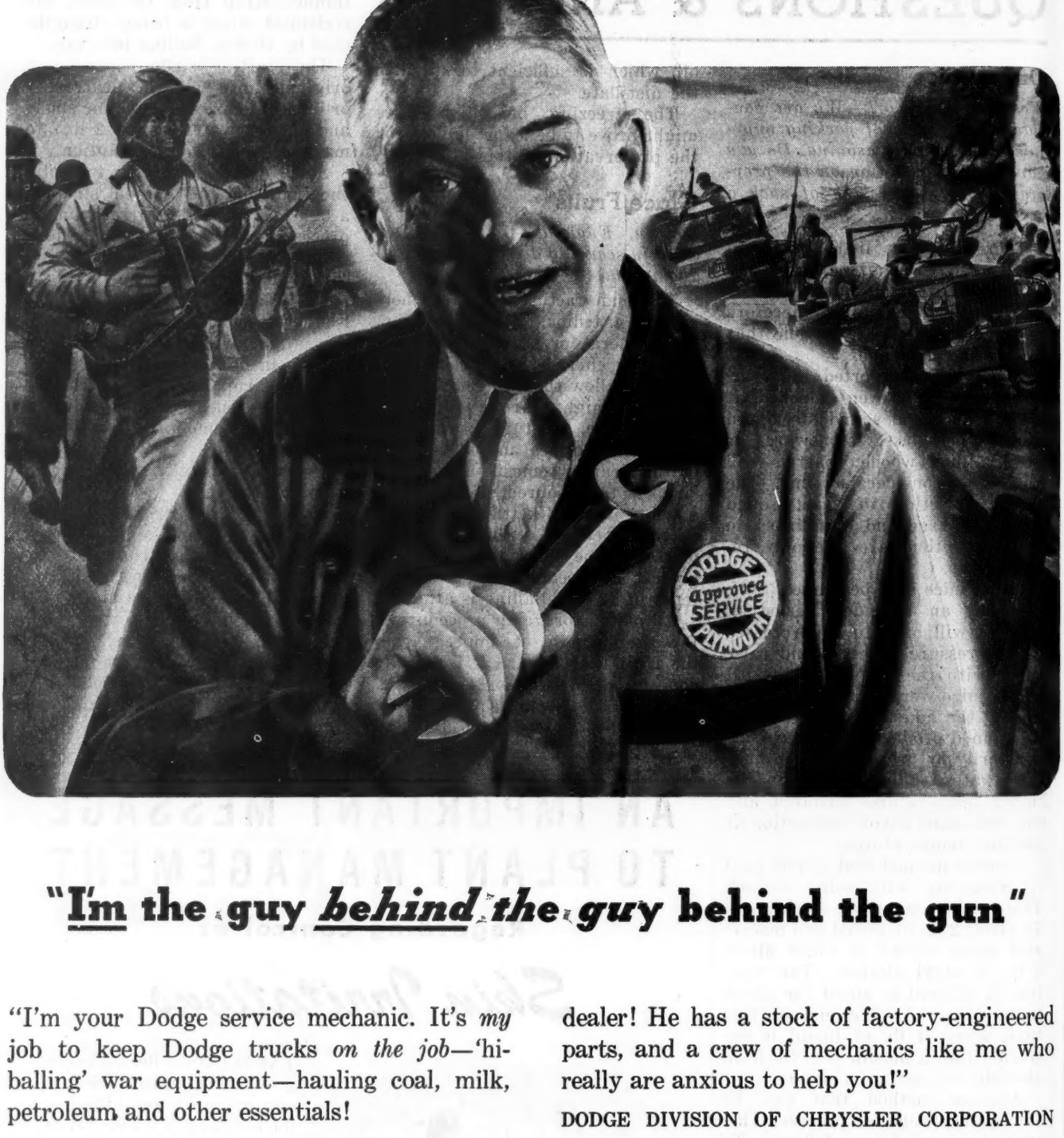
TARBONIS is easy to apply, unnecessary to remove, will not stain or soil, and is *harmless to the foods handled.*

FREE: A generous sample of TARBONIS. Our Dispensing Plan Manual. Booklet for employees.

THE TARBONIS COMPANY

4300 EUCLID AVENUE Dept. FI CLEVELAND 3, OHIO

BUY WAR BONDS



"I'm the guy *behind* the *guy* behind the gun"

"I'm your Dodge service mechanic. It's *my* job to keep Dodge trucks *on the job*—'hi-balling' war equipment—hauling coal, milk, petroleum and other essentials!

"It's *my* job, too, to keep Dodge and Plymouth passenger cars *on the job* . . . carrying millions of essential war workers to *their* jobs.

"I'm busy, sure. But if YOU need car or truck service to help do *your* war job better . . . I'll take care of you somehow.

"Get in touch with my boss—your Dodge dealer! He has a stock of factory-engineered parts, and a crew of mechanics like me who really are anxious to help you!"

DODGE DIVISION OF CHRYSLER CORPORATION

★ ★ ★

NEW TRUCKS AVAILABLE—Dodge is now building new 1½ and 2-ton trucks, in limited quantities, for essential use. We suggest that you see your dependable Dodge dealer for the right Dodge Job-Rated truck to fit your job—save you money!

DODGE *Job Rated* TRUCKS
FIT THE JOB . . . LAST LONGER

TUNE IN MAJOR BOWES, CBS, THURSDAY, 9 P. M., E. W. T.

AMERICA'S AUTOMOTIVE SERVICE MECHANICS ARE HELPING MIGHTILY TO WIN THE WAR!

BOOKS

Sanitation

MICROANALYSIS OF FOOD AND DRUG PRODUCTS. Prepared by the Microanalytical Division, Food and Drug Administration and Federal Security Agency, Issued as Food and Drug Circular No. 1, 1944. 171 pages; 5¾x9 in.; paper. For sale by the Superintendent of Documents, Washington, D. C. Price, 30 cents.

The information gathered here will be of value to the food analyst who is concerned with contamination and the identification of filth. The authentic material consists of various insect parts, rodent and cat hairs, fibers, crystalline substances and the like, mounted on slides and Riker mounts of such materials as dried fruits, coca beans and nutmegs.

While the actual detailed methods involved in filth extraction are given in an earlier work, "The Manual of Microanalytical Methods," this discussion attempts to give the reasons behind these procedures. The methods can thus be carried out with intelligent understanding.

The chapter on plant sanitation reveals this important aspect of food processing from the point of view of the F&DA analyst and imparts some tips that all food men should want to know.

Automatic Control

FUNDAMENTALS OF PRESSURE AND TEMPERATURE INSTRUMENTS. Prepared at National Defense Curriculum Laboratory, Cornell University, Ithaca, N. Y. Published by Bureau of Industrial and Technical Education, the State Educational Department, University of the State of New York, Albany, N. Y., 1944. 232 pages; 8¼x10¾ in.; paper, spiral binding. Price, $1.75.

Developed to provide a basic training course in the fundamentals of pressure, temperature, humidity and flow instruments, this monograph will enable food plant operators and technologists to gain an intelligent understanding of the functioning of control instruments. With the trend in postwar food processing definitely in the direction of more automatic control, food plant men can profit well from a perusal of such information.

Starting with a discussion of heat versus temperature, the treatise continues through such factors as heat transfer, vapor pressure of liquids, theory of pressure measurements, humidity measurements, and temperature and flow determinations. It explains the theory, mechanics and physical factors involved in instrumentation.

The construction and operating principles of different types of instruments are shown in drawings and interpreted in text. Being diagrammatic in style, and therefore simple and easily understood, the illustrations clearly convey the principles they are intended to interpret.

While this work will not make an instrumentation expert out of a layman, it will equip the practical food plant man to better understand what pressure, temperature and flow instruments will do and how they do it. This knowledge, in turn, will enable him more intelligently to specify to the instrument and equipment manufacturer what he needs for his processes. Much more, it will enable him to evaluate the technical suggestions and advice that the instrument engineer gives him when he comes into his plant either to sell him new equipment or to instruct him in the proper use of his equipment.

Hunger and Plenty

FOOD FOR THE WORLD. Edited by Theodore W. Schultz. Published by the University of Chicago Press, Chicago 37, Ill. 353 pages; 6x9¼ in., cloth. Price, $3.75.

A world economy that frequently develops the lop-sided aspect of a burdensome oversupply of food on the one hand and under-nourishment and actual starvation on the other must have haunted most civilizations at one time or other. Now that communications are bringing the peoples of the five continents so much closer, this condition can hardly be shrugged off as an incurable case of maldistribution.

This book develops the thesis that far more than the farmer, food manufacturer and food distributor must be brought into the picture, if this economic blight is to be overcome. Twenty-three essays and the discussion they aroused, at the 20th Institute of the Norman Wait Harris Foundation, held at the University of Chicago, last September, make up the book. The points of view of the nutritionist, economist, sociologist, population expert and statesman, along with those of the doctor, teacher, cook and housewife are

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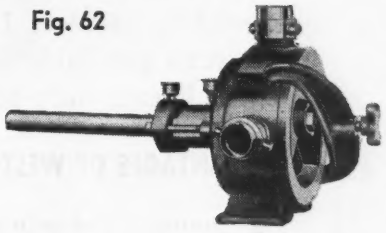
Fig. 62



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considered. The cooperation of all will be necessary during the next 25 to 50 years.

The papers are not particularly concerned with postwar feeding as such. They are very much concerned with whether the United States will produce more food than its people will need; whether Russia can increase its food production by about 80 per cent in order to satisfy its rapidly growing population and rising standard of living; whether India, with its high birth rate and primitive agricultural methods, can increase food supplies enough to improve the diets of its people. Coming nearer home, they ask how poverty, as a cause of malnutrition, can be combatted.

The American industrialist, even those in the food field, may feel that these questions are rather far from his front door. But with the economic fabric expanding and interlacing so rapidly, the world's maladjustments are becoming business liabilities that even the smallest can see and feel.

GOVERNMENT PUBLICATIONS

ALASKA FISHERY AND FUR-SEAL INDUSTRIES: 1943. By Ward T. Bower. Fish and Wildlife Service, Statistical Digest No. 10. Available from Superintendent of Documents, Washington 25, D. C. Price, 15 cents.

GOVERNMENT-OWNED PATENTS AND INVENTIONS OF GOVERNMENT EMPLOYEES AND CONTRACTORS. Second Report of the National Patent Planning Commission. House Document No. 22. Available from Superintendent of Documents, Washington 25, D. C. Price, 10 cents. Recommendations for amendment of the patent law and its administration.

PURCHASE OF DOMINICAN FOOD SURPLUSES. State Department, Executive Agreement Series 404. Available from the Superintendent of Documents, Washington 25, D. C. Price, 10 cents. Agreement between the United States and the Dominican Republic.

THE CARE OF FLOORS. Bureau of Standards, Letter Circular LC 764. Free. A resume of good practice, including suggested specifications for materials to be used.

IMPROVEMENT OF LABOR-UTILIZATION PROCEDURES. Bureau of Labor Statistics. Bulletin No. 807. Available from the Superintendent of Documents, Washington 25, D. C. Price 10 cents. A summary of suggestions from the Department of Labor for management officers of industry.

Keeping Red Berries Red

Stainless steel is used by cranberry processors because kettles made of this corrosion-resistant metal will not turn the fruit black or blue, nor will they impair the natural taste. The vessels, in turn, are not harmed by the acid fruit.

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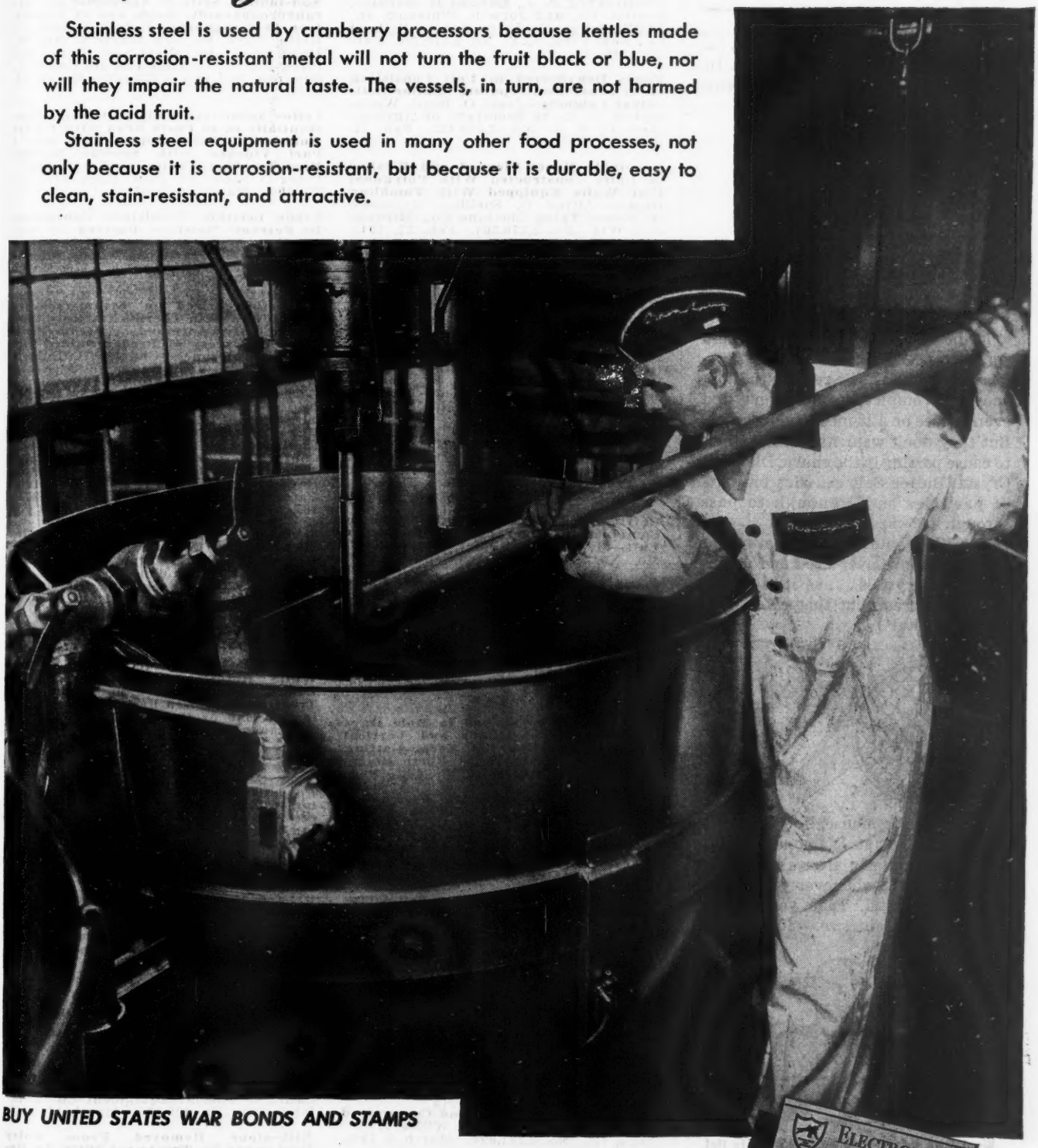

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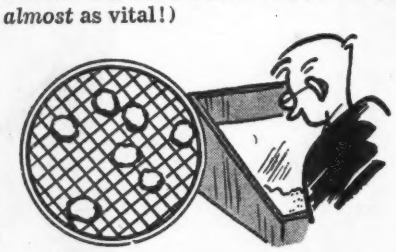
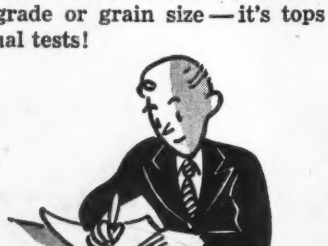


Happily for the mouse, he got results. And so do we at Diamond Crystal. That's why you can always be sure of clean screening whenever you specify Diamond Crystal. Take your choice of grade or grain size — it's tops by actual tests!



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PATENTS

Vegetables and Like Dehydrated in Rotating-drum Unit—Frank B. Doyle, Phillipsburg, N. J., Edward H. Markley, Easton, Pa., and John F. Plummer, Jr., Phillipsburg, N. J., to Ingersoll-Rand Co., New York, N. Y. No. 2,370,295. Feb. 27, 1945.

Foods Dehydrated in Unit Consisting of At Least Two Separate Similar Individual Cabinets—Jesse O. Read, Washington, D. C., to Secretary of Agriculture, U. S. A. No. 2,370,422. Feb. 27, 1945.

Vegetable Roots Cleaned and Washed in Units Constructed With Polygonal Flat Walls Equipped With Tumbling Blades—Alfred G. Suelflow, deceased, to Felins Tying Machine Co., Milwaukee, Wis. No. 2,370,504. Feb. 27, 1945.

Starch Converted Into Sugar by Biochemical Process—George A. Jeffreys, Calcium, N. Y., to Nelson Littell, New Canaan, Conn. No. 2,370,665. March 6, 1945.

Dehydration Accomplished During Passage Through Elongated Casing Equipped With Superimposed Drying Decks Over Which Heated Medium Passes Through Casing in Contact With Material to Be Dried—Theodore Veit, New York, N. Y. No. 2,370,825. March 6, 1945.

Cheese Made By Use of Tryptic Enzyme—Zola D. Roundy, Chicago, and Havard L. Keil, Clarendon Hills, Ill., to Armour and Co., Chicago, Ill. Nos. 2,370,878 and 2,370,879. March 6, 1945.

Refrigerated Bakery Doughs Made in Combination Mixer and Water Cooler Unit—Merlin A. Sticelber, Kansas City, Mo. No. 2,370,888. March 6, 1945.

Continuous Stream of Liquid Fatty Material Chilled to Below Melting Point Without Hardening and Shaped in Plurality of Molds by Congealing and Subsequently Removed Mechanically in Continuous Manner—Jacob Schaub, deceased, by Betty A. Schaub, executrix, Westfield, N. J., to The Best Foods, Inc., New York, N. Y. No. 2,370,920. March 6, 1945.

Butter and Like Shaped In Mold Having Dividing Partitions and Vertical Ribs on Partitions to Form Cutting Imprints—John L. Wade, North Hollywood, Calif., one-third to self, one-third to Ray Swanson, Los Angeles, and one-third to William Wirt Lake, Pasedena, Calif. No. 2,370,925. March 6, 1945.

Fish Cleaned by Mechanical Means—Lyman H. Funkey, Marinette, Wis. No. 2,370,947. March 6, 1945.

Pectin Processed to Form α-d-Galacturonic Acid—Charles S. Hollander, to Röhm & Haas Co., Philadelphia, Pa. No. 2,370,961. March 6, 1945.

Bottled Foods and Vegetables Mechanically Packed Into Shipping Containers—John Cattonar, Jamaica, and George Olm, Astoria, Long Island, N. Y., to Edward Ermold Co., New York, N. Y. Nos. 2,371,026 and 2,371,027. March 6, 1945.

Berries Cleaned and Sized by Mechanical Means—Emil Rivers, Rockland, Maine. No. 2,371,067. March 6, 1945.

Roasted Coffee Ground and Compressed Into Tablets—Walter W. Willison, Chicago, Ill. No. 2,371,093. March 6, 1945.

Bulk, Flowable Material Dehydrated While Moving in Vertical Path of Gravitational Descent and With Gradual Lateral Spreading — Hiram W. Woodward, Baltimore, Md., one-half to Strasburger & Siegel, Baltimore, Md. No. 2,371,095. March 6, 1945.

Foods Protected Against Mold, Bacteria or Yeast-growth Spoilage by Packaging in Non-breathing Moisture-proof Container in Atmosphere of Bactericidal and Fungicidal Gas—Francis K. Baerwald, Berkeley, Calif., to Rosenberg Bros. & Co., San Francisco, Calif. No. 2,370,768. March 6, 1945.

Flours and Breakfast Cereals Fortified by Mineral Enrichments Consisting of Non-ionized Salts of Anacardic or Tetrahydroanacardic Acids and of Copper, Iron or Manganese—Robert E. Sadtler, Ridley Park, Pa., one-fourth to Ney W. Underwood, Jr., Cleveland, Ohio, and three-fourths to Atlas Powder Co., Wilmington, Del. No. 2,371,189. March 13, 1945.

Coffee Substitute Made to Consist Substantially of 16 Parts Bran with 1 Part Molasses, 2 Parts Poplar Bark and 1 Part Vinegar with Specific Mixing, Heat Treating, Cooling and Grinding—Peter O. Scow, St. Paul, Minn. No. 2,371,320. March 13, 1945.

Crude Lecithin Emulsions Containing 10 Percent Moisture Purified by Extraction With Ethylene Dichloride—Robert H. Sifferd, Lyons, Ill., to Armour & Co., Chicago, Ill. No. 2,371,476. March 13, 1945.

Milk Pasteurized in Steam-jacketed Unit Fitted with Thermostatically Controlled Valve Actuated by Steam Pressures in Excess of Predetermined Operating Tolerance—Charles B. Dalzell, Little Falls, and Raymond J. Neely, Middleville, N. Y., to Cherry-Burrell Corp., Chicago, Ill. No. 2,371,807, March 20, 1945.

Eggs Mechanically Washed in Unit Equipped with Plurality of Brushes and Continuous Conveyor Operating in and Through Washing Fluid — John R. Bayles, Clay Center, Kan., to Industrial Patents Corp., Chicago, Ill. No. 2,371,867. March 20, 1945.

Shrinkage in Animal Carcasses Reduced During Cooler Storage by Tight-wrapping, While Warm, with Desized Muslin—Carl L. Lohner, Chicago, and Dean E. Rueckert, Mokena, Ill., to Industrial Patents Corp., Chicago, Ill. No. 2,371,967. March 20, 1945.

Canned Evaporated Milk Sterilized by Heating to Between 260 and 270 Deg. F. for Period Not to Exceed 2 Min. While Rotating Horizontally About Longitudinal Axis of Cans During Heat Treating, Followed by Immediate Cooling at End of Heating Time—Randall Whitaker, Robert P. Myers, and Robert E. Homberger, to Sealtest, Inc., Baltimore, Md. No. 2,372,239. March 27, 1945.

Foodstuffs Rapidly Frozen While Passing in Single Layer on Conveyor in Direct Contact With Liquid of Low Freezing Point Applied to Flow and Cascade Over Material Being Frozen—Joseph L. Gilson, Hartsdale, N. Y. No. 2,372,373. March 27, 1945.

Oxygen Removed From Headspace of Containers Filled With Foaming Beverage by Two-step Application of Inert Gas With Second Step Adjusted to Be Sufficiently Vigorous to Cause Beverage to Foam Immediately Prior to Sealing of Container—Robert J. Stewart, to Crown Cork & Seal Co., Inc., Baltimore, Md. No. 2,372,457. March 27, 1945.

Canadian Patents

Halved Fruits Pitted by Mechanical Means—Rollie B. Nawman, Oakland, Calif., to Special Equipment Co., Portland, Ore. No. 426,135. March 13, 1945.

Milk-stone Removed From Dairy Equipment by Treatment With An Orthophosphoric Acid Solution Having pH Value from 1.5 to 3.0—Carl Johnson Maplewood, N. J. No. 426,171. March 20, 1945.

Skinless Sausages Marked by Transfer of Marking on Outer Surface of Temporary Casing by Penetration Through Casing to Surface of Sausage Material—Louis J. Menges, South Orange, N. J. No. 426,174. March 20, 1945.

Mayonnaise Made to Have Tomato and Onion Flavoring Ingredients — Susan Elizabeth Swalwell, North Bay, Ontario, Canada. No. 426,183. March 20, 1945.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

PACKAGING

Low-pressure Pack

CARBON DIOXIDE transmission was found to be relatively high through a wax-coated laminated cellophane which had been selected on the basis of its low oxygen transmission to pack dried milk powder and other easily oxidized materials. This circumstance has been utilized to produce a partial vacuum within the flexible pack.

Oxygen was removed by subjecting the filled and sealed container (provided with a brogue hole), to a vacuum and then flooding the chamber with carbon dioxide. The vent hole was then sealed with wax. CO_2 escapes to the air, but the contrary movement of air is prevented by the low transmission rate of the barrier. The package collapses about the contents so as to produce a block which remains firm as long as the vacuum is maintained. Packs remained firm in storage about 6 months.

Dropping tests indicated a reasonable resistance to rough handling at normal temperatures, but the package is fragile at sharp freezing temperatures.

Storage tests with dried milk powder indicated little or no advantage for the gas packing technic.

Earlier Canadian tests on packages proposed for shipment of foods overseas had indicated that a rectangular package is preferable to a cylindrical container. The cylinder is stronger, but the difficulty of providing well sealed ends makes its use unsatisfactory.

Tests were conducted on completed packages containing hygroscopic materials, such as dried eggs and dried milk, since it was found that even under the best conditions the water vapor pickup of the package was two to ten times as high as that of the same material in sheet form.

Bag-in-box packages were selected for dried whole eggs and other such materials. Wax dipping followed by an overwrap produced a water-vapor resistant package, but the former type was preferred because it eliminated the wrapping operation. Pouch-type liners were chosen, to avoid danger of leakage around wedge-type seals.

The 14-lb. container consists of a bag of 450 M.S.Y.T. cellophane with a wax coat on the inside, fitting into a 60-lb. kraft bag, which, in turn, is enclosed in a high-strength corrugated carton sealed with 2-in. cloth tape.

In all tests on moisture transmission, wax coatings, either sprayed or dipped, gave better results than lacquers and resins.

Digest from "Packaging. I. Water-vapour Resistance of Cellulose-base Containers," by A. H. Woodcock, M. G. Chapman and J. A. Pearce; and "II. A Cellulose-base Container for Modified Vacuum Packing," by Woodcock, Canadian Journal of Research, vol. 23, 109-16 and 117-22, March, 1945.

BAKING

Ration Biscuits

PROTEIN supplements were added to ration biscuits. For a standard mix, with approximately 9 to 9.5 percent protein, 60 to 62 percent starch and 9 to 10.6 percent fat, and with moisture between 4.7 and 7.6, wheat germ appeared a more satisfactory source of protein than soya flour, dried skim milk or dried egg yolk.

Taste tests determined acceptability. Of the physical tests used, only fluorescence gave any promise of significant correlation with the organoleptic judgment. The pH of KCl, NaCl and alcohol extracts decreased on storage, for all temperatures and for all types of packaging, but no correlation could be found with the condition of the biscuits.

At higher temperatures, cellophane was more effective than the more highly moisture vapor resistant packaging materials, from the standpoint of palatability, but at high humidities the cellophane-wrapped biscuits molded so as to become inedible.

A further series of tests on ration biscuit composition, with higher fat levels, showed that if a high caloric biscuit is required it is possible to increase the fat content to as much as 23 percent without destroying the keeping quality, provided a well-stabilized vegetable fat is used. There is evidence that unpalatability is due to breakdown of nonfat ingredients before significant changes take place in the fat.

Digest from "Ration Biscuits I. Factors Affecting the Keeping Quality of Biscuits Containing Protein Supplements," by J. A. Pearce and J. B. Marshall, and "II. Effect of Type and Concentration of Shortening on Keeping Quality," by G. A. Grant, J. B. Marshall and W. H. White, Canadian Journal of Research, vol. 23, 22-28, January, 1945, and 123-31, March, 1945.

Separation of Gluten

DOUGHS mixed beyond the stage of easy gluten separation by washing can be separated by the use of a special technic. When the dough from 35 gram of flour is mixed with about 350 ml. of water in a Waring blender, using low speed for 5 minutes, and then allowed to stand, a starch layer settles to the bottom, the gluten appears as a foam on the top and between is a clear liquid. The foam can be skimmed off and centrifuged, 5 minutes at 2,000 r.p.m. giving best results.

The glutenous material that settles in the bottom of the bowl can be separated from the remaining starch by washing.

It is possible by adding starch repeatedly after an initial overmixing to get the gluten so dispersed that it cannot be separated by even this technic. There appears to be no essential change in the gluten due to overmixing. It is a question of minute intermingling of the gluten and starch.

Digest from "Dough Development and Mechanical Gluten Dispersion in Relation to Amount of Mixing and to the Flour-water Ratio," by C. O. Swanson and A. C. Andrews, Cereal Chemistry, vol. 22, 60-75, January, 1945.

DEHYDRATION

Increases Capacity

PREDRYING of material for dehydration by the use of a high-velocity current of superheated steam to remove the bulk of the moisture is now covered by patent. The steam, substantially free from noncondensible gases, is circulated over the wet material under temperature and moisture conditions such that the wet-bulb temperature within the drying chamber is as

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near as possible to the temperature of dry saturated steam at the pressure within the drying chamber. The patentee states that this causes moisture to flow from the interior of the product to the surface at substantially the rate at which it is vaporized from the surface.

The predrying step is intended to reduce both the weight of water to be removed in the dehydration equipment and the bulk of material to be handled.

Digest from U. S. Patent 2,365,890, issued December 26, 1944, on an application filed October 5, 1942, to D. M. McBean, Rochester, N. Y.

MEATS

Fat in Meat

CONTROL tests for fat in meat products are needed. A modified Babcock method is here suggested.

The finely ground sample is comminuted with ice and Oakite in a Waring blender. A weighed sample of the resulting emulsion is mixed with glacial acetic acid to coagulate the protein, then concentrated sulphuric acid is added alternately with hot water, in the Babcock bottle. After centrifuging, the fat column can be read and the reading multiplied by a suitable factor to give the percentage of fat in the original meat product.

Manipulative details are given in the article. The results are in good agreement with the A.O.A.C. ether extraction procedure.

Digest from "Rapid Determination of Fat in Meat and Meat Products," by R. B. Oesting and I. P. Kaufman, Analytical Edition, Industrial and Engineering Chemistry, vol. 17, 125, February, 1945.

Swiss Steak

PROCESSING methods which preserve the original shape and essentially maintain the original size of pieces of meat during canning are disclosed in a new patent.

Individual pieces of beef, in the form of steaks, are coated with flour and browned in deep fat. Advantages of this step are that it seals the meat cells against loss of moisture during subsequent sterilizing, eliminates air from the meat pieces and provides the thickening normally used in the gravy of Swiss steak. The browning must not be carried to the point of cooking the meat. Exposure to fat at 250 deg. F. for 5 minutes or less is required.

The preheated and browned steaks are separated from one another in the can by vegetable parchment.

The cans are partially filled with

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boiling beef stock gravy before the wrapped meat is added. Seasonings and flavorings are introduced in this gravy.

The packing of the can must be done so that the contents are above 180 deg. F. when sealed. One result of the higher temperature on filling is to exclude air. Gravy is added to the filled can, leaving only the desired headspace.

Vacuum sealing may be used but is not essential. In the example given by the patentee the cans are retorted at 240 deg. F. for 3 hours, then immediately cooled under pressure. This is stated to result in satisfactory sterilization, particularly when the cans are packed hot, but the patentee points out that in commercial canning the sterilization time must comply with the Federal requirements.

The claims cover the process substantially as given in the example, without limitation on processing times and temperatures.

Digest from U. S. Patent 2,366,169, issued January 2, 1945, on an application filed April 23, 1942, to August Barth, and assigned to Dunbar Packing Co.

DAIRY

Better Cheese

DEVELOPMENT of the characteristic cheddar flavor in cheese is aided by pasteurization of the milk. Pasteurization does not make good cheese out of poor milk. Even when pasteurized, the bacteriological quality of the original milk is the controlling factor in the quality of cheese made from it. Pasteurization, however, does permit control of the acid developed, and cheese made from pasteurized milk with proper control of acid development can be ripened safely at a temperature high enough to permit continued activity of those bacteria that are essential for flavor development.

Ripening should be at 50 deg. F. or over. After proper ripening, storage at 34 deg. F. will prevent undesirable flavors.

Starter should be added only in sufficient quantity to give a pH of 5.3 to 5.5 at the time of milling, which should be done not less than 4½ hours after setting. When removed from the press after 24 hours, the cheese must still contain an appreciable quantity of milk sugar so that a slow fermentation will continue during ripening.

Digest from "The Manufacture of Cheddar Cheese from Pasteurized Milk," by H. L. Wilson, S. A. Hall and L. A. Rogers, Journal of Dairy Science, vol. 28, 187-200, March, 1945.

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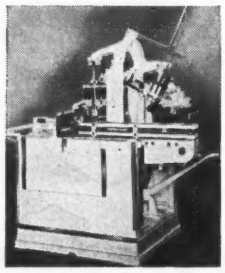
Only the most efficient, most economical labeling set-up, geared to your individual production needs, is going to meet the strenuous demands of the future.

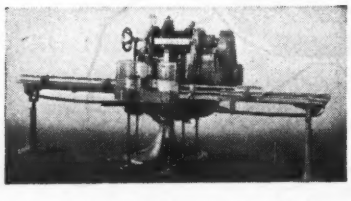
Isn't it good sense to discuss your labeling facilities and plans with the leading specialists in the field—the one builder of Labelers that builds *all kinds?* A few facts about your production, present or contemplated, your containers and labels is all we need to okay your present set-up or propose improvements that will mean better labeling and more of it per hour at lower cost.

The WORLD Semi-Automatic Labeler, Model S, for applying body labels, neck labels, foil, all-around labels, to any size container from ampoules to gallons.

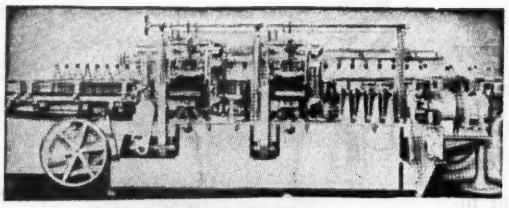


The WORLD TURRET Labeler for high quality, low cost labeling on smooth, fluted or fancy containers.

WORLD LABELERS



The WORLD ROTARY Labeler for dependable, mass production labeling of all kinds of round bottles and jars.



The WORLD BEE-LINE Labeler for quality-quantity application of front labels, front and back labels, and neck labels if desired, to round, square, flat, oval or panel containers of all kinds and sizes.

"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY

Builders of World Automatic and Semi-Automatic Labelers for Every Purpose

WORKCESTER, MASSACHUSETTS

New York Philadelphia Pittsburgh Chicago San Francisco Boston Louisville Salt Lake City El Paso Seattle Portland London Montreal Toronto Winnipeg Spokane Vancouver Sydney, Australia Wellington, N.Z. Rio de Janeiro, S.A.

FERMENTATION

Pickle Spoilage

SPOILAGE and softening of genuine Kosher dill pickles is of the same type as that occurring in salt stock, genuine dills and other pickles. It is an enzymatic breakdown of the interior portion of the pickle, especially in the seed area.

Garlic buds have been found a source of infection, and it is important to avoid use of garlic which shows evidence of mold or bacteria. Garlic that has been blanched and sterilized or dehydrated, as well as garlic vinegar, may be used.

Storage of this type of pickles for not more than 6 months, and preferably not more than 4 months, is advisable. A 5 to 10 percent loss in 21 weeks was found under the most favorable storage conditions.

Loss of firmness due to loss of water from the pickle cells is not spoilage. It may be caused by the action of heat during pasteurization, a slight acid hydrolysis of the pectic material, or by the action of the brine.

Digest from "Experimental Work on Cucumber Fermentation. XIII. Influence of Garlic on the Softening of Genuine Kosher Dill Pickles," by F. W. Wenzel, Jr., and F. W. Fabian, Technical Bulletin 199, Michigan State College Agricultural Experiment Station, February, 1945.

FOOD CHEMISTRY

Vegetable Starch

STARCH determination, in fresh, frozen or canned vegetables, based on color development with iodine, is rapid and reasonably accurate.

The method is not applicable to woody tissue which cannot be disintegrated by the wet-grinding procedure, nor to certain tissues that are very low in starch.

Any iodine colorimetric method for the accurate determination of starch must take into account the effect on the color produced of variations in the ratio of amylose to amylopectin, since amylose gives a strong blue color while amylopectin gives a weak violet color. Fortunately, for most vegetables this ratio is similar to that of potato starch, which is about 20 percent amylose and 80 percent amylopectin. Because potato starch is available all year 'round, it is used for the standard in setting up comparisons.

The two types of starch that vary widely from the average are waxy corn, which is practically 100 percent amylopectin, and that of

STARCH is at War*

★ in PAPER used to plan the attack

U. S. Navy Photo

A U. S. Navy photo records the damage to a Jap Pacific air base. Reconnaissance photos provided detailed installation data, and objective maps, prepared by skilled photo-interpreters, selected the targets for pin-point bombing. Photographic paper and special paper necessary for accurate speed reproduction of military charts and maps *use substantial quantities of starch!*

★ in TEXTILES used to make the attack

U. S. Army Photo

Snow capes, like camouflage cloth, increase the effectiveness of a soldier in battle. And like barrage balloon cloth, cotton duck, tent twill, surgical gauze, parachute cloth for flares — they're made of single yarn fabric. None could be woven *without the use of large quantities of starch* as warp size.

DO YOU KNOW? that starch products are also used in signal flares, colored smoke grenades and sky markers to control the burning rate . . . in batteries as a carrier for the electrolytic agent . . . in field rations as a basic food item in the diet of our fighting men . . . in drugs and medicines to facilitate tableting, to standardize dosage, to increase the rate of dispersion . . . in aluminum to hasten settling and filtration of the crude sodium aluminate solution . . . in boiler treating compounds for especial Navy use.

Remember this — if you're unable to obtain starch products to meet your civilian requirements — *starch is at war in hundreds of ways!* Our first responsibility is to formulate and produce starch products for vital war applications. National is proud of the high trust placed in its research, service and production facilities by our armed forces.

Specific war application information is available — NOW! Address: National Starch Products, 270 Madison Avenue, New York 16; Boston, Philadelphia, Chicago, Indianapolis, San Francisco and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto and Montreal.

National STARCH PRODUCTS

STARCHES — AND SPECIALTIES WITH EASILY DEMONSTRATED SUPERIORITY

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LINED STEEL CONTAINER
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Assurance –to you
for positive product protection in transit or storage.
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Steri Seald LINED STEEL CONTAINERS can be depended upon at all times for NO SPOILAGE, NO LEAKAGE, NO CONTAMINATION.
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garden-type wrinkled-seeded peas, which is probably about 75 percent amylose, 25 percent amylopectin.

For the colorimetric method, the sample is disintegrated with water in an electric food blender, the starch is solubilized with perchloric acid and neutralized with sodium hydroxide. Comparison determinations with this method, using an improved technic, and by both the enzymatic and acid hydrolysis, showed good agreement between the colorimetric values and those obtained by acid hydrolysis. The enzyme conversion gave lower and less consistent values for peas and difficulties were encountered with some other vegetables.

Precautions must be observed when samples of vegetable tissues are to be stored before chemical examination, because of the errors that may be introduced by amylase action. This applies particularly to sweet potatoes and carrots. Apples, soybeans and perhaps other products will convert part of their starch to sugar if not inhibited.

Digest from "Rapid Determination of Starch," by J. P. Nielsen and P. C. Gleason, Analytical Edition, Industrial and Engineering Chemistry, vol. 17, 131-4, March, 1945.

FATS AND OILS

Adsorbent pH

COLOR, odor and peroxide content of edible oils are all influenced by the pH of the adsorbent.

There is a trend toward better color removal with lower pH, especially with Menhaden and with coconut oil, using active carbon. Cottonseed oil showed an optimum range at pH values between 6.1 and 4.5, with definitely less satisfactory color when the carbons were below pH 4.

Odor for both coconut and cottonseed oils was improved with carbon down to pH 4.5, but below that point an increase was noted. This is not due to failure to remove the original odor but to development of a foreign odor. Clays appear to be less effective than carbons for odor removal.

Peroxide values are lowered with lower pH in both clays and carbons, but greater initial removal is often associated with a more rapid subsequent increase. The reason for this has not been explored, but it may be due to removal of stabilizing substances or to a chemical reaction with lower pH adsorbents.

Digest from "Influence of pH of the Adsorbent on the Properties of Edible Oils and Fats," by J. W. Hassler, Oil & Soap, vol. 22, 60-62, March, 1945.

FORMULAS FOR FOODS

FORMULA NO. 531

Tropical Water Ice

Granulated sugar	8 lb.
Corn sirup solids	4 lb.
Water	28 lb.
Papaya puree	5 lb.
Guava puree	5 lb.
Gelatine	1½ oz.
Pectin	1½ oz.
Oat flour stabilizer*	2 oz.
Mandarine-peel extract	2 oz.
Strawberry certified color	4 oz.
Citric acid, 50% solution (or equivalent)	4 oz.

*Avenex

Directions

Combine the sugar, corn sirup solids, gelatine, pectin and stabilizer by mixing them thoroughly while dry. Heat the water to 180 deg. F. Sift the dry mixture into the hot water and stir vigorously until solution is complete. Cool to about 50 deg. F. Add the fruit purees, flavor, color and acid.

Place the mix in the freezer. Whip and freeze until an overrun of about 40 percent is obtained. Remove from the freezer, put in containers, and harden at about –15 deg. F.

For a milk sherbet, about one quart of the water can be replaced by an equal volume of ice cream mix or condensed milk. This is best accomplished by adding the milk at the freezer before the acid is put into the mix, to prevent curdling.

Formula from B. I. Masurovsky.

FORMULA NO. 532

Starch Jelly Gums

Corn sirup	65 lb.
Standardized invert sugar	35 lb.
Water, cold	80 lb.
Thin boiling starch (50-60 fluidity)	10 lb.
Citric or tartaric acid, powdered	1 oz.
Color	as desired
Flavor	as desired

Directions

Place the corn sirup, standardized invert sugar and half of the water in a kettle. Mix the starch and acid with the remainder of the water, adding this to the batch. Turn on the steam and cook to a good jelly string. Add the color and flavor, mixing thoroughly.

Cast the batch into warm starch impressions and place the trays in a drying room at approximately 135 deg. F. Allow to remain for a minimum of 10 hours. Jellies may then be removed from the starch and moistened. Sand with sugar crystals or coat with icing.

This is a wartime formula.

Formula from The Nulomoline Co.

FORMULA NO. 533

Prize Ring

Sugar	3 lb.
Emulsifying shortening	1 lb. 8 oz.
Salt	1½ oz.
Whole eggs	1 lb. 8 oz.
Milk	2 lb. 8 oz.
Flour	3 lb.
Baking powder	1½ oz.
Chopped nuts	12 oz.
Chopped dates	1 lb. 14 oz.
Rind of 6 oranges, grated	

Directions

Cream the sugar, shortening and salt on low speed for 1 minute, then on medium speed for 4 minutes. Add the eggs gradually, continuing to cream for 5 minutes on medium speed. Add the milk alternately with the flour and baking powder sifted together. Then mix in the chopped nuts, dates and orange rind.

Bake in Tukshead molds. Scale 12 oz. in a 1-qt. mold.

Bake at 360 deg. F. When baked, remove from tins and wash with the juice of 6 oranges in which has been dissolved 1 lb. 5 oz. of powdered sugar.

Formula from the Experimental Bakery, Armour & Co.

FORMULA NO. 534

Peanut Fluff Cake

High-grade cake flour	5 lb.
Fine granulated sugar	6 lb. 5 oz.
Baking powder	4½ oz.
All-purpose shortening	2 lb.
Salt	3 oz.
Liquid milk	4 lb. 4 oz.
Whole eggs	2 lb. 12 oz.
Egg whites	8 oz.
Invert sirup	4 oz.

Directions

Mix the flour, sugar, baking powder, shortening and salt on low speed for 2 minutes. Add 1 lb. 12 oz. of milk, then the peanut butter. Mix for 7 minutes on low speed. Mix together the whole eggs, egg whites, the remainder of the milk and the invert sirup. Add 3½ lb. of this mixture, then mix for 3 minutes still on low speed. Stop the machine and carefully scrape the bottom and sides of the mixing bowl. Clean the paddle well. Add the balance of the egg-milk mixture gradually, mixing for 3 minutes more on low speed. Bake as single layer or as cup cakes.

The shortening should be at a temperature of 70 to 75 deg. F. and the egg-milk mixture at 70 to 80 deg. F.

Bake at 385 to 395 deg. F. Bake lightly. Do not overbake. Cup cakes can be baked at 410 deg. F. if a bold rounded top is desired.

Formula from Lever Bros. Co.

FORMULA NO. 535

Chocolate Sponge Pie

Egg yolks	1 lb.
Whole eggs	1 lb. 8 oz.
Enzyme-converted corn sirup	3 lb.
Brown sugar	2 lb.
Full-fat soya flour	1 lb. 8 oz.
Vanilla	1 oz.
Salt	½ oz.
Butter	4 oz.
Chocolate	1 lb.
Water	8 lb.
Egg white meringue (optional)	1 lb. 8 oz.

Directions

Beat together thoroughly the egg yolks, whole eggs, corn sirup, brown sugar, soya flour, vanilla and salt. Melt the butter and chocolate together and mix in when barely melted. Warm the water and stir in. Then fold in the egg white meringue, if this is used.

Fill into unbaked pastry-lined tins that have been allowed to dry. Fill completely full. Bake at about 385 deg. F. with little top heat. Do not overbake.

The amount of chocolate can be varied, depending on the flavor desired. For a lighter chocolate flavor, 10 oz. of lightly dutched cocoa and 3 oz. more of butter can be used in place of the chocolate.

This formula produces a thick foam top. If less foam is desired, reduce the amount of egg white meringue or omit it completely.

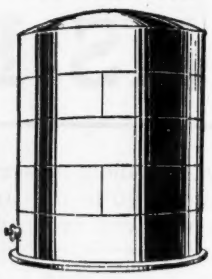
Formula from A. E. Staley Mfg. Co.

Correction

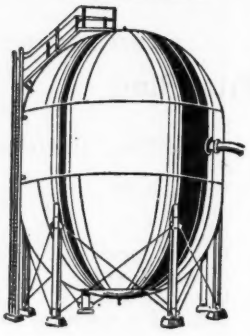
In the April issue, in Formula No. 527, quantities of soda and baking powder were stated as 3¼ and 1¼ lb. These should be 3¼ oz. and 1¼ oz.—THE EDITORS.

Submit your Special "STEEL STRUCTURES" Problems to us

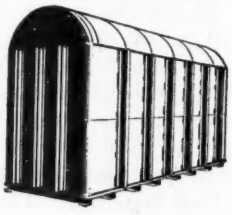
STORAGE TANKS



HIGH PRESSURE GAS HOLDERS



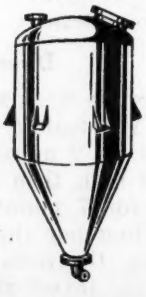
PROCESSING TANKS



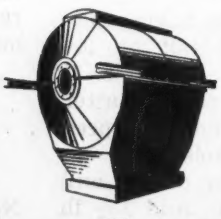
VATS and COOKERS

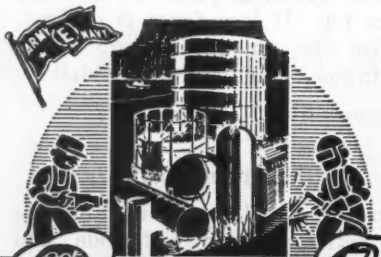
KETTLES

DIGESTERS



MIXERS





Do you have a storage or processing problem or requirement involving special tanks or vessels of aluminum, steel, or alloys—in welded, riveted, or bolted construction? We shall be pleased to submit quotations and recommendations based upon our specialized experience in the production of such equipment.

Stacey Brothers' long experience and established policy of constant research have produced results in design, production, and field erection techniques that have definitely established their leadership in metal fabrication. You profit from this policy thru more efficient designs, worthwhile reductions, and more stable structures with longer life.

In addition to fabricating the designs developed by our customers, Stacey Brothers also regularly design special storage and processing equipment in accordance with specifications supplied. We are set up to produce one unit or on a quantity basis.

Let us figure on your requirements. Send us blueprints, specifications, or request to call. Write for your copy of Bulletin G-45. It will give you a good idea of the broad scope of our facilities, and the various types of special equipment we are prepared to produce.

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GAS CONSTRUCTION COMPANY
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Stacey Brothers
ENGINEERS • FABRICATORS
ERECTORS • RECOGNIZED
EXPERIENCE & FACILITIES

New Know-How From Research

(*Continued from page* 85)

quantity should be limited to 5 percent or less of all-mash growing diets, to 8 percent or less of growing mashes that contain 20 to 22 percent protein, and to 12 percent or less of the mashes that contain 32 percent protein.

Quality of Dry Milk

A study of 1,200 samples of dried whole milk which had been commercially packed revealed that some of the nitrogen-packed samples contained as much as 13 percent of oxygen, indicating very poor methods of evacuation and packing to exclude oxygen. Samples that contained about 3 or 4 percent of oxygen were found to keep twice as long as similar powder packed in air. The conclusion was reached that considerable quantities of oxygen-containing gases are held within dry whole milk powder by adsorption, even after the oxygen in the free space in the package had been reduced to 3 or 4 percent. Failure of the usual evaculation procedures to remove these residual gases was thought to be responsible for poor keeping quality in most instances. The most practical method of attaining a concentration of less than 3 percent of oxygen in the container is through the use of a vacuum or more than 29 in.

Mature Potatoes Needed for Dehydration

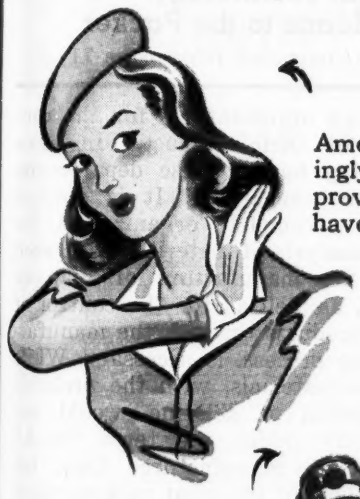
Dehydration studies of potatoes have been extended to include early-crop southern potatoes grown in a considerable number of production centers. Mediocre quality of the dehydrated product was found to be associated with the customary harvesting of the crop before maturity. Higher yields of dry product of much better quality were obtained by allowing the potatoes to reach full maturity before digging. This work has added considerably to knowledge of causes of discoloration in preparing and drying potatoes and of methods of preventing some of them.

Cold Storage Improves Dehydrated Quality

Cold storage of onions for dehydration gave a gain over common storage of 44 percent in the yield of dried product, largely because of better control of decay.

FACTS WORTH REMEMBERING

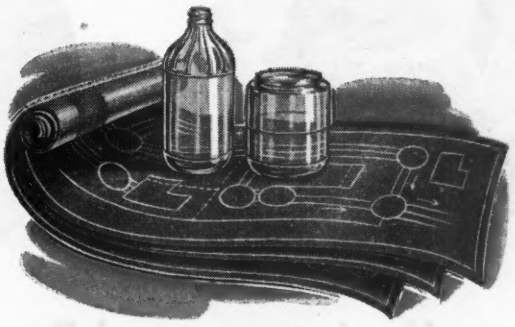
WHEN MAKING YOUR PACKING PLANS



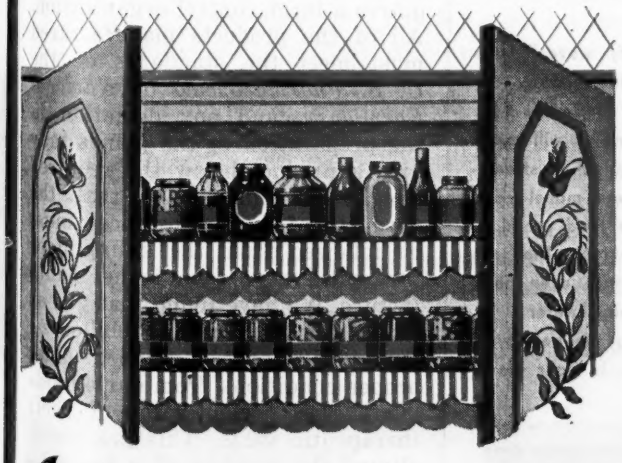
American women have never willingly given up any practical improvement in living to which they have become accustomed.

Owens-Illinois "know-how" gives them a lift to production . . . Owens-Illinois merchandising service gives them a lift in distribution . . . Duraglas Container advertising to millions of consumers gives a lift to the sales of products packed in Duraglas jars and bottles.

American women have now become accustomed to seeing the quantity, quality, color and condition of the foods they buy for their families. They have become accustomed to a package which offers greater convenience in use.



Include Duraglas Containers in your packing plans. Add the power of a preferred package to public acceptance of your brands.



Users of Duraglas Containers enjoy special benefits from their production lines to their customers' minds because:

OWENS-ILLINOIS GLASS COMPANY

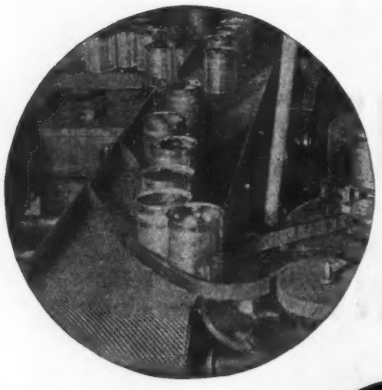
TOLEDO 1, OHIO

Branches in All Principal Cities

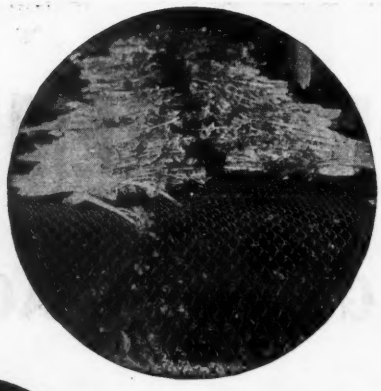
Duraglas

BOTTLES

Preserve, Protect, SELL ON SIGHT



CANNING



WASHING

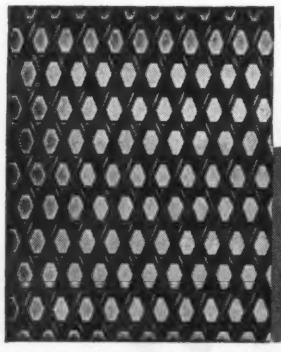
INSPECTING

BRINING

BAKING

Un-interrupted Production With A Processing-Conveyor

Audubon "Metalwove" Continuous Processing-Conveyor Belts of "flexibly woven" wire eliminate the costly production delays of batch processing. Belts can be installed so they are self-loading and self-unloading, thus every operation becomes a smooth, continuous flow. In war-time this means more vitally needed production, and in peace-time it will mean more vitally important profits. You'll have an edge on competitors who neglect to streamline their processing with Metalwove Belts . . . Belts are made of stainless steel, monel metal or any other ductile metal. Various weaves are available to safely handle food products. Belts are supplied with retaining edge and with cleats for inclined conveying. They are easily cleaned and will give excellent service for continuous processing with oven heat, freezing cold, blanching steam or washing water . . . Our engineers will assist you in selecting the best type of Metalwove Belts, for every operation in your plant. Catalog on request.



AUDUBON

WIRE CLOTH CORPORATION

Subsidiary of Manganese Steel Forge Co.

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Representatives in Most Principal Cities

Appearance and quality of the final product were also superior. In the storage of potatoes for dehydration, the best quality product was from stock held at 50 to 60 deg. F. At lower temperatures, the potatoes developed excessive quantities of sugar and became undesirably dark during dehydration. The best dried sweet potatoes product came from stock stored at 55 to 60 deg. F.; even a few days' exposure to temperatures below 50 deg. resulted in poor quality.

What Technology Means to the Packer

(*Continued from page* 71)

oratory organizations for the control of their products. In some packing houses these departments are not separated. It is obvious that a complete organization for the analysis of materials purchased for the manufacture of soap or glue, as well as for the control of the products through the manufacturing process, is necessary. While these materials, with the probable exception of gelatine, would not classify under the term "food," they are manufactured from by-products of the meat packing plant and are a part of the technology connected with this industry.

Service to Society

One of the greatest contributions to humanity which has resulted from the introduction of the technologist into the packing plant is the development of various pharmaceutical products from animal glands. This division in itself requires a large control organization. All of the products manufactured must meet the standards of the *U. S. Pharmacopoeia* or *National Formulary*, and any deviation in the preparation of the glands may give a product below the required standards. This means that the products of such substances must be followed from the killing floor through every step of the manufacture. We have found that glands which are not properly chilled on the killing floor, or shipped under proper conditions from our outside plants, lose considerable of their therapeutic value. This has necessitated the services of a technologist to visit these plants at regular intervals and to see that all instructions as to the handling of the raw materials are followed. Some years ago, it was discovered that the thyroid glands of livestock in

Off the Greer Multi-Tier Conveyor in the Hills Brothers' plant in Brooklyn come, in peacetime, millions of perfectly pasteurized packages of Dromedary Dates. This installation has brought about *continuous* pasteurization and increased production—at tremendous saving of floor space: 36 feet of floor space provides 535 feet of processing travel.

This is typical of Greer engineering ingenuity and of the adaptability of the Greer Multi-Tier principle. In wartime, this same machine is doing a tremendous job in turning out concentrated fruit bars for Ration K. The Conveyor is automatically loaded and unloaded so that it fits with the greatest possible efficiency and smoothness into the production line.

With the Greer system, products can be continuously cooled, heated, dried, or pasteurized. Overhead areas are readily utilized, even to the height of two or three stories. This reduces non-productive floor space to an absolute minimum. Yet products can be conveyed as long as processing requires before delivering them to the next operation. Today, Greer Multi-Tier Conveyors are continuously processing candy, crackers, cookies, bread, fruit, shoe paste, and rubber compound.

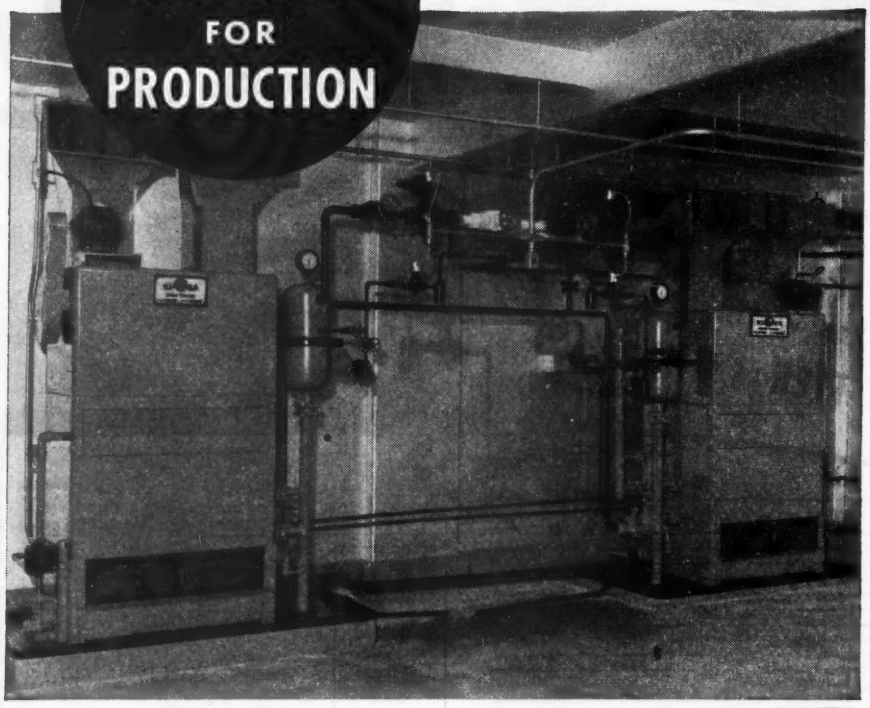
If floor space is a problem with you or if you are laying out a new plant, write today for free Booklet F-5 giving detailed information about the Greer Multi-Tier Conveyor.

J. W. Greer Company,
119 Windsor Street,
Cambridge 39, Mass.

MAKERS OF FAMOUS **GREER** MULTI-TIER CONVEYORS

MORE CAPACITY FOR PRODUCTION

with NIAGARA "No Frost" METHOD



PATENTED

● You obtain increased productive capacity. . . without adding to refrigeration compressor equipment . . . by installing the NIAGARA "No-Frost" METHOD of refrigeration for pre-cooling chilling, freezing or holding storage . . . for instance, all meat products, the freezing of foods, the hardening of ice cream.

You cool to any temperature required with spray type fan coolers, using NIAGARA "No-Frost" LIQUID.

There is no frosting or de-frosting. NIAGARA "No-Frost" LIQUID is maintained automatically in correct proportions. By preventing frosting of coils, you gain the *constant use at full capacity of your equipment.* Old systems lose this full capacity the first hour ice starts to form upon coils.

Experience with the NIAGARA "No-Frost" METHOD proves that savings in power pay for the equipment. *Gains in capacity increase plant production earnings.*

Write for Bulletin 83

NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

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Field Engineering Offices in Principal Cities

INDUSTRIAL COOLING HEATING • DRYING

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certain areas had a lower iodine content than those coming from other sections. A study of this indicated that livestock in the cold areas, such as the Dakotas, had a lower iodine content in the thyroid than that from Texas. It was also discovered that there was a seasonal variation, the content being higher in the summer and fall than in the winter and spring.

Technology, Inc.

The research laboratory is organized into divisions very similar to those described for the control laboratory. In these days of specialization, the research laboratory has men specially trained in all phases of chemistry. It has among its personnel organic chemists, physical chemists, biochemists, bacteriologists, nutritionists, chemical engineers, and others trained along special lines in their university careers.

The research laboratory is concerned with several different kinds of projects; namely:

1. To improve old processes and products.
2. To invent new processes and products.
3. *To make use of inventions developed outside of the organization and attempt to apply them to the industry.*

We shall try to illustrate in Part II some of the work which falls within these various classifications.

Match the Motor To the Fan

(*Continued from page* 87)

that it may be connected for high-speed operation and switched to another winding connection to give low-speed operation. In terms of characteristics, the motor really has two separate speed-torque curves on the two connections, so that the motor speed-torque curves will intersect the fan characteristic curve at two separate values of speed, and the equipment will be stable at a high speed and again at a lower speed. This is illustrated in Fig. 3.

Avoid Overheating

Heat is the principal energy loss in all motor drives, and removing the heat from the motor to keep its total temperature within safe limits is a major engineering problem. Insulation life sets the limit on maximum allowable motor temperature, since excessive overheating will break down the insulation rapidly, causing the motor to fail.

TRAILMOBILE SERVICE IN ACTION

... so Ed poured on the torch

Just 2 inches from a GI's pants!

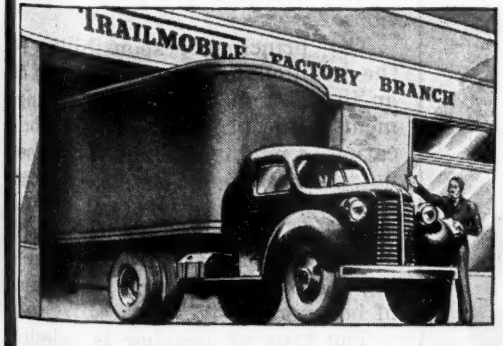
Another Crisis!—An urgent call from Roadway Express near quitting time to hold a crew! An Army-convoyed trailer packed with winter uniforms desperately needed overseas was limping into Pittsburgh. It had to have emergency attention—or miss the boat next morning!

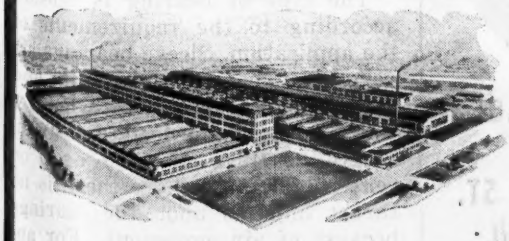
That cripple was on the verge of a wreck. The upper fifth wheel plate was loose—about ready to let go! Serious? And how! A job for the burning torch!

Can we unload the uniforms? The Army says "No!—the load is sealed."

How'll we burn that plate away from the floor without maybe sending those uniforms up in smoke?

Charley's got it! "Look," he says, "why can't we soak the underside of the floor so it won't burn?" We cross our fingers. And Ed pours on the torch—2 inches from some G.I.'s winter pants!





It works! A few hours later the rig is on its way again . . . in time to make the boat. Our customer is tickled—so is the Army. We're ready for the next crisis!

Here's the point. Trailmobile Service was available *when* and *where* it was needed—and with the ready resourcefulness to do an "impossible" job. We're doing it every day for the country's leading operators—why not for you? Ask for a list of Trailmobile's 60-odd strategically located Servicenters.

The Trailmobile Company, Cincinnati 9, Ohio; Berkeley 2, California; Charlotte, North Carolina.

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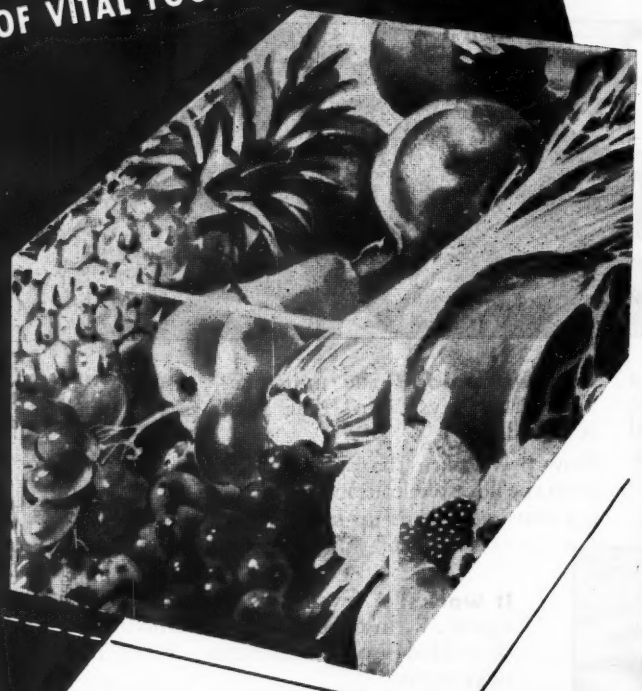
THE DELICIOUS FRESH FLAVOR
THE NATURAL APPEARANCE
THE VITAMIN CONTENT
THE NUTRITIONAL VALUE
OF VITAL FOOD AND MEATS

Expert, economical handling and proper storage of frozen foods and meats a specialty in each of the 14 warehouses. Their facilities are at your service now.



14 *Well Situated*
COLD STORAGE WAREHOUSES

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The City Ice & Fuel Company
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COLD STORAGE DIVISION
33 S. CLARK ST.
Chicago 3, Ill.

Even moderate overheating over a period of time will age the insulation. For open motors, a total temperature not exceeding 95 deg. C. (203 deg. F.) in the windings has been found to be a safe maximum temperature for standard insulation. Motors are rated in temperature rise over an assumed maximum 40 deg. C. ambient (surrounding air temperature) as follows: Open motors, 40 deg. C. rise; splashproof motors, 50 deg. C. rise; totally enclosed, nonventilated and totally enclosed fan-cooled motors, 55 deg. C. rise.

Motor Enclosures

The vital motor windings and insulation also must be protected from physical damage, and the problem of providing the maximum amount of enclosure without restricting the ventilation is being solved with increasing success on modern motors. The totally enclosed motor provides the best protection, but it is somewhat higher in price than an open, ventilated motor. The closer you can approach a totally enclosed motor design while still maintaining sufficient ventilation, the better protection you will have.

The recognized motor enclosures with the protection they offer and some of their limitations, are given in Table 1 for a 1-hp., 1800-r.p.m. motor.

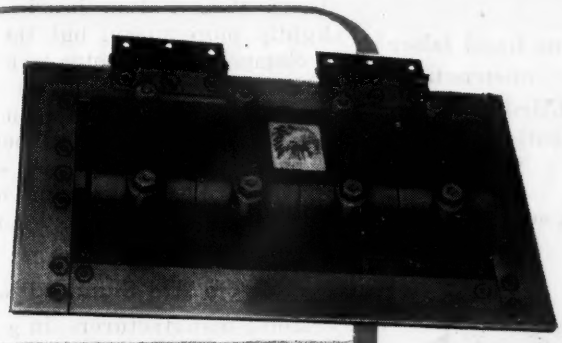
Bearings and Lubrication

Good bearings are as essential a part of motor construction as the windings. In many motor applications, of which fan drive is an example, the motor bearings serve as bearings for the entire apparatus. The bearings, in turn, depend upon their lubrication for proper operation.

The principal responsibility of the maintenance men in charge of an installation of motorized equipment is the proper care and lubrication of motor bearings. This does not mean a squirt of oil or a dab of grease at intervals, but careful adherence to the instructions issued by motor manufacturers concerning the proper care and lubrication of bearings.

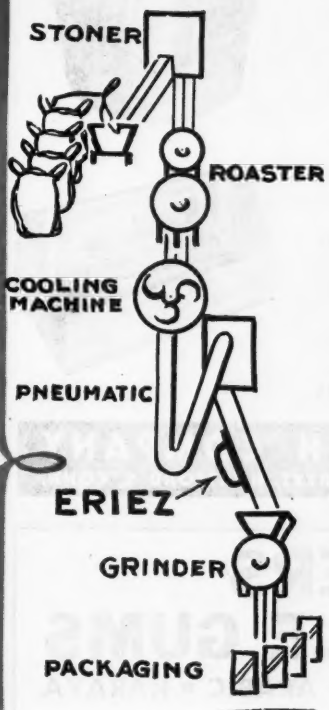
The type of bearing is selected according to the requirements of the application. Sleeve bearings are very quiet, have a high radial load capacity, and can be used wherever there is no axial load or thrust. Sleeve bearings may be used on centrifugal fans where there is no thrust imposed upon the bearings because of air movement. For applications such as propeller fans

HOW TO REMOVE STRAY IRON FROM FOODS IN PROCESS



ERIEZ Non Electric Magnetic Separators Are Used in Processing:

FRUITS SOUPS
MEATS BARLEY
BAKING POWDER
★ COFFEE COCOA
CANDIES SPICES
DRIED FOODS
SUGAR JELLIES
VEGETABLE RICE
ICE CREAM
PECTIN OIL MEALS
MACARONI MALT
VEGETABLE OILS
HOPS BEVERAGES
WHEAT SYRUPS
CHOCOLATE
CORN FISH MEALS
RELISHES GRAIN
PEANUT BUTTER
FLOUR STARCH
★ TEA POTATOES
SALAD DRESSING



★ No. 2 Case Study

TEA AND COFFEE CLEANING

Recent installations of Eriez Non Electric Permanent Magnetic Separators in large plants producing teas and coffee are reported to be making amazing savings, protecting grinding machinery as well as improving the quality of product packaged. The fact that Eriez Magnets are available in sizes to fit conveyor belts, chutes, feed tables, air ducts, regardless of their width and position, has proven particularly valuable to these concerns.

Insulated for installation on steel chutes or conveyors Eriez Magnets can be suspended above shallow chutes or beneath the deep chutes, quickly swung away for the cleaning of accumulated stray iron and snapped back into position again with a minimum of delay in the flow of materials.

It is of particular interest to note the following Eriez users who are successfully removing stray iron from their products in Process. Jabez Burns & Sons, Inc., Lipton's Tea, Martinson Coffee Company, Alex Sheppard & Sons, Inc., The Weideman Company, Francis H. Leggert & Company, Haserot Coffee Company.

First cost is last cost. The chief electrician of a large processing mill figures the saving in power along effected by Eriez Permanent Magnets to be $71.12 per year or 1¢ per kilowatt hour, plant running 24 hours on a 6½ day week.

Write for Bulletin 102A today giving full details on the ease of installation of Eriez Non Electric Permanent Magnetic Separators at your plant.

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FULLERGRIPT brushes are made to eliminate laborious hand labor or to do a better cleaning job than brushes of any other construction. With permanent metal arbors, brushes are easily refilled. Special brushes have been designed for many particular operations in the food industry.

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RESEARCH, ANALYSES, and CONSULTATION for the FOOD, DRUG, and ALLIED INDUSTRIES

and axial-flow fans, it is necessary to use ball bearings, since they can absorb thrust. Ball bearings are slightly more noisy, but they can be clamped in the motor to prevent axial movement of the shaft and to absorb any thrust which the load may impose. In addition, they may be mounted in any position, whereas standard sleeve-bearing motors always must be mounted horizontally.

Motors Are Standardized

Motor manufacturers, in general, do not offer to design a special motor for each job as it presents itself. Instead, they offer a standardized line of motors which have characteristics suitable for the greatest number of different applications. The industry has standardized upon horsepower, speed ratings, and allowable maximum temperature ratings. This allows each motor manufacturer to offer for sale a comparable product in terms of power ratings.

A motor for fan drive is normally of standard electrical design. The only problem is to secure adequate protection and suitable mechanical features to permit the motor-fan unit to be easily assembled and installed.

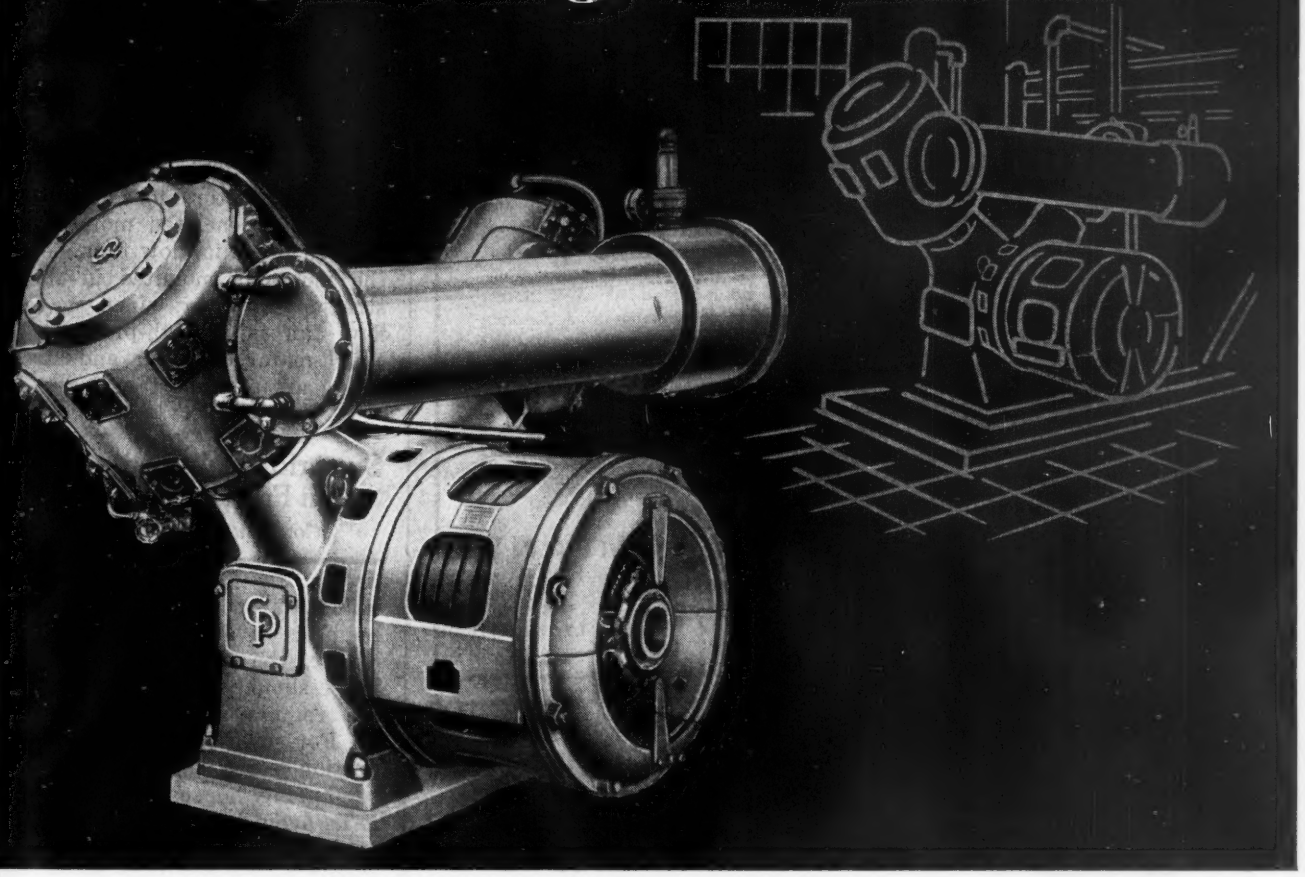
Three Types of Fans

For different applications, the fan builder has at his disposal three general types of fans. The centrifugal blower and the axial-flow fan are high-pressure fans used in conjunction with duct systems to pump air to remote locations. The propeller fan is a low-pressure unit principally used as a ventilating fan to exhaust air from one room, or area, to the outdoors.

The mechanical construction of a fan motor and the protection it must afford depend principally on the type of fan installation which is being made. Motors for centrifugal blowers may be of open type, sleeve-bearing construction, since the blower operates in a duct system and the motors are normally located in a machinery room which is clean and free from excessive moisture. In some cases, enclosed motors are mounted outdoors or in dusty and dirty locations.

Motors for propeller fan service usually are of totally enclosed construction, since these motors operate in the air stream and are exposed to the air being moved by the fan. Also, propeller fans are usually located in less accessible places than centrifugal blowers. Therefore, every precaution should be taken to

SHIPPED INTACT
Quickly Installed



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SHIPPED intact, all ready for external connections, CP Type Y Compressor is easily and quickly installed. It is exceptionally compact, requiring only minimum floor space. Large area Simplate valves, multi-step capacity regulation, effective intercooling, precision bearings and force-feed lubrication are responsible for its low power consumption and low maintenance costs. CP Type Y compressors with built-in or direct coupled motors or with V-belt drive are available in capacities of 300 to 900 c.f.m. at 80 to 125 pounds pressure; other sizes available for higher and lower pressures. Write for Bulletin 766.

There is a CP Compressor, stationary or portable, for every air requirement from 25 to 10,000 c.f.m. for pressures up to 5,000 pounds.

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Indicating Thermometer
Model F-1, $20.
Available with or without capillary tubing for distant reading.

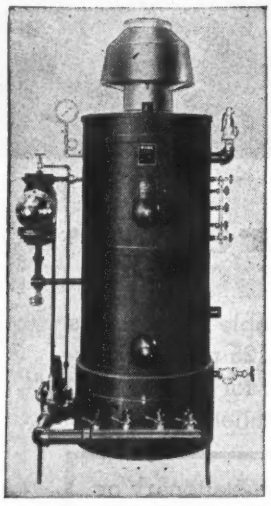
How to Protect the Quality of Processed Foods

When temperature variations affect the quality and taste-appeal of your food products you need the reliable temperature indication of AUTO-LITE Thermometers.

The low cost of these instruments permits economical use of temperature indication throughout processing and storage operations. Simply constructed, without intricate mechanism to get out of order, AUTO-LITE Indicating Thermometers may be mounted wherever observation is most convenient—at a distance if necessary from where temperatures are taken.

In addition to a wide range of thermometers and gauges, we specialize in the production of instruments of special design for use as a standard part of manufacturers' equipment.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
CHRYSLER BUILDING NEW YORK 17, N. Y.



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The scientifically designed KANE is your best buy when the time comes to get a new boiler—if your requirements call for an automatic, gas-fired unit, built to A. S. M. E. Code in a size up to 30 H.P.

If your present boiler will serve you a while longer don't plan for replacement until the war is over. These are not the days to invest in new equipment, if you can make the old do.

The famous KANE, highly efficient and an economical user of fuel, is a good boiler to look forward to owning. Let us plan for your post war needs. We will gladly study your problems now and recommend the size boiler, control equipment and boiler feed system best suited to your plant.

There is no obligation. Engineering consultation welcomed . . . write today.

MEAES-KANE OFFELT
Manufacturers of Automatic Steam Boilers for over a third of a century
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protect the motor windings and moving parts from accumulations of dirt and foreign particles carried by the moving air, and to provide maximum protection against any mild corrosive elements in the air stream. For this application, advantage may be taken of the air drawn over the motor as a method of dissipating its heat. This additional provision for cooling the motor permits the use of a smaller and lighter frame for the same horsepower and speed than that used for a standard totally enclosed motor with no additional facilities for cooling. This makes the propeller fan motor more economical.

A totally enclosed motor should be used for axial-flow fans, because the motor is mounted in the air stream. However, since the axial flow fan is a high-pressure fan, small motor diameter and streamlining are of importance.

Superior Dehydrated Cut Fruits

(*Continued from page* 98)

tunnel as soon as possible. If no room is available in the dehydrater, the doors of the sulphur house should remain closed, even if the regular sulphuring period is up. For smooth operation, no dehydration plant should be short of sulphuring houses.

To avoid health hazards to plant personnel, sulphuring houses should be built out of doors, sufficiently far away from the air inlets to the tunnels so that the fumes are not drawn into the plant when the houses are opened. Another remedy is to build a piping system connected to a central exhaust fan, which quickly can remove the fumes from a house before opening. Sulphur dioxide may cause gas poisoning if inhaled constantly over an extended period.

Dehydration

The fruit is finally dried to completion in a countercurrent tunnel dehydrater. The higher the air flow and the higher the finishing temperature, the more cars a tunnel can hold without exceeding the maximum allowable humidity at the cool end. The rate of air flow should be from 600 to 1,000 linear feet per minute. Careful observations by Stadtman and others have shown that the finishing temperature may be as high as 160 deg. F. if the fruit is not dried to a moisture content lower than 25 percent.

Whose portrait is this?

Come the end of the war, this will be a portrait of the consumer. Once again he will get on his high horse.

He will insist on: Superior merchandise . . . Attractive packaging . . . Low prices. And he will get his way, more and more, as time goes on.

Many businessmen like you are preparing for these days.

Clues for you . . .

We believe we can help you get the favor of the man in the postwar saddle.

In our dealings and experiments for Uncle Sam these past few years, we have developed many improvements in packaging. We have found new ways to speed packing, improve appearance and saleability.

Perhaps from this war experience, we can develop new ideas that may be adapted to your coming packaging problems.

Co-operating with you . . .

At your service are our engineering and research staffs. They will analyze your problems, work with you hand in hand. Why don't you investigate these possibilities? Just call on our local representative, or write to our main office.

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Sifters, Crushers, Cutters, Dry and Liquid Mixers, Mills, Grinders, Pulverizers, Conveyor Systems, Complete Installations.
The handling equipment construction "know-how" of the Mercer Engineering Works, Inc., Clifton, N. J. . . . The more than 40 years processing equipment experience of Robinson Mfg. Co., Muncy, Pa. . . . All are embodied in and represented by
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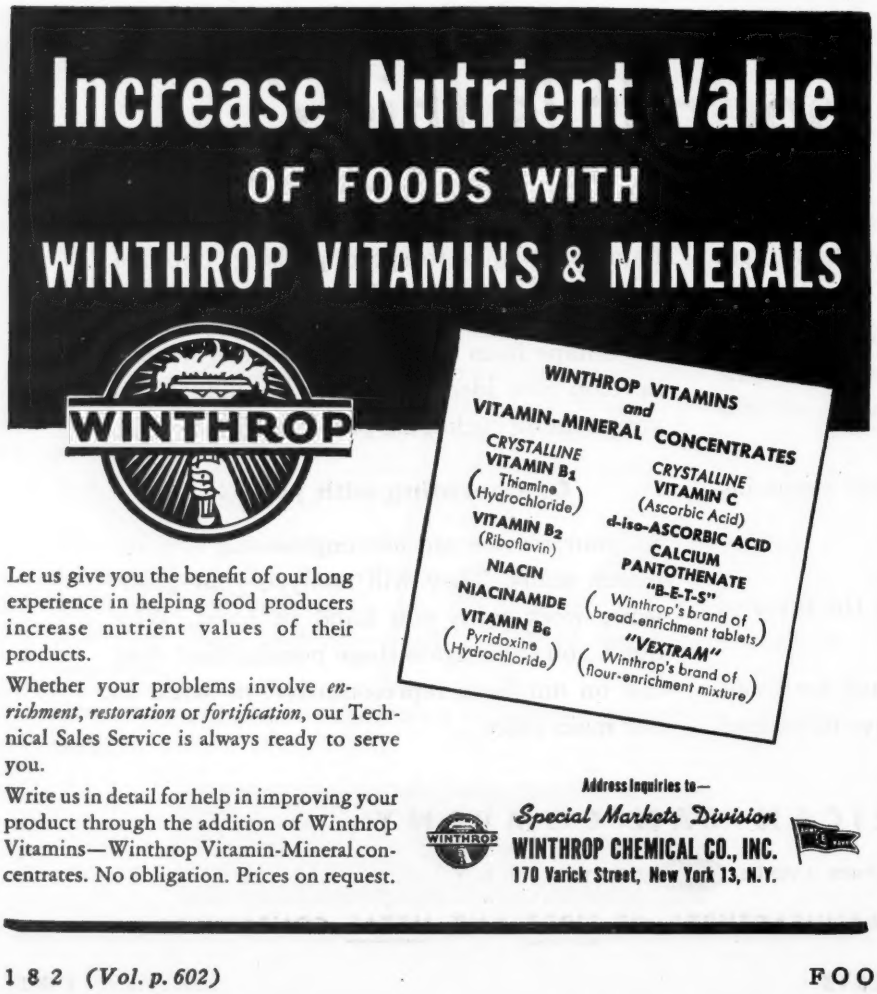
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NIACIN
NIACINAMIDE
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The finishing temperature should be lowered to 145 or 150 deg. F., respectively, if 17 or 20 percent moisture is required. Heat damage becomes greater as the moisture content becomes lower. Not only is the fruit longer in the dehydrater, but the flesh temperature of the fruit during the final stage of drying approaches that of the drying air. Also, the concentration of the reacting substances causing biochemical deterioration becomes greater.

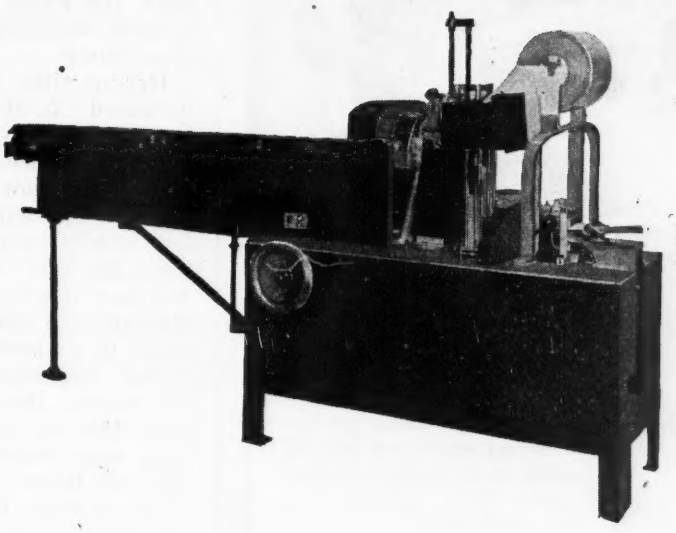
If the furnace and burner are of sufficient capacity, no air should be recirculated when enough cars can be introduced to create a relative humidity of about 60 percent at the wet end of the tunnel. A simple way to determine whether the exhaust air becomes too humid is to read the wet-bulb termometer (which is always very nearly the same in all sections of the tunnel) and to place a dry bulb thermometer in the exhaust air.

After placing a fresh car in the tunnel the differential between dry- and wet-bulb temperatures should not be smaller than 15 deg. F. For instance, if the wet-bulb reading is 90 deg. F., the exhaust-air temperature should never be lower than 105 deg. F. The air drops about 9 to 10 deg. F. in temperature right after a new car (3x6 ft.) is introduced. The temperature at the cool end rises slowly, since the previously introduced fruit becomes gradually dryer, and when the air reaches a temperature of about 115 deg. F. (in the example cited above), a new car is put in.

If recirculation is applied, the humidity becomes greater and the wet-bulb temperature rises. With the above rule in mind, one can easily see that the total tunnel load will have to be reduced. If this is not done, or the tunnel is overloaded with too many cars, or cars are introduced in too rapid succession, the result invariably is that the humidity becomes excessive, the drying rate drops to zero, and very large losses in sulphur dioxide take place. Recirculation becomes advantageous only where slow drying fruits, like prunes, are concerned.

During the hot summer months, the fruit on trays continues to lose moisture fairly rapidly after removal from the hot dehydrater, but this process of drying out is greatly reduced when the fruit is stored in tight lug boxes stacked closely together. (Tables II and III.) In the 1944 season, because of labor scarcity, a considerable number of

Your Favorite Peanut Butter Crackers Soon Will Be Wrapped, Sealed & Labeled By Wright's High-Speed Sandwich Wrapper



A group of alert manufacturers have ordered and will receive soon the new Wright's Automatic Hi-Speed Sandwich wrapper.

You'll know when this latest achievement of Wright's "Idea into action staff" is put into actual use. You'll know because your favorite cracker sandwich will appear in a neater, more attractive package. A package which permits visibility on all four sides. You'll know because your favorite cracker sandwich will taste better. The moisture-tight fold seals in goodness and keeps it fresh longer.

Yes, and the manufacturer's accounting department will know, too, merely by taking a look at the cost sheets. This machine reduces labor costs by as much as 600%; does a better packaging job with 20% less cellophane.

If you are a manufacturer of cracker sandwiches, cookies, fig bars or similar products but for some reason have not investigated this new machine, don't delay another day. Get full details by writing to us, or even better, have your top engineer and sales executive visit our plant in Durham, North Carolina, for a personal inspection. Action now will enable you to get quicker delivery when war conditions permit us to manufacture additional machines.

P. S. To All Manufacturers

What Wright's "Idea into action staff" has done for the cracker sandwich industry is no fluke. Fifty-two years of experience and skill went into this job. They're available, too, in meeting the automatic packaging needs your company may require. We cannot promise you an over-night solution. Our plants are up to their neck in war work. But you can save time by permitting us to make a preliminary study now. All correspondence handled in strict confidence.

WRIGHT'S *Automatic Machinery Company*

333 Calvin Street — Durham, North Carolina

"Specialists Since 1893 In Putting Labor Serving Ideas Into Action"

SYNTRON
REG. TRADE MARK
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DRY FEEDER MACHINES
Increase Production
Reduce Labor Costs
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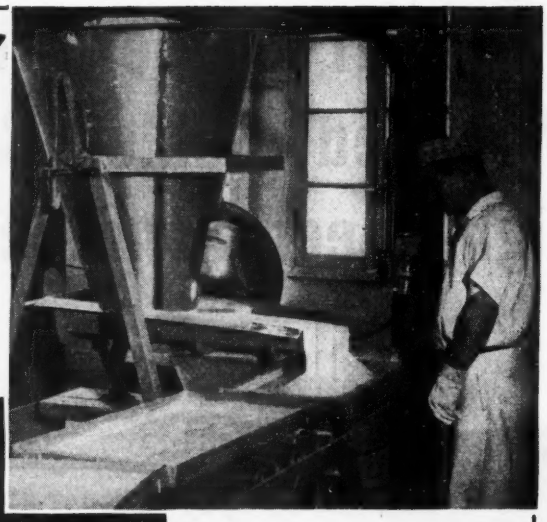

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CYCLONE CONVEYOR BELTS

Cyclone Flat Wire belt helps this processing and cooling conveyor to operate efficiently for long periods without breakdowns. Standard opening sizes are 1" x 1" and ½" x 1".

YOU get (1) prompt service and cooperation, (2) practical engineering aid . . . when you put your belt problems up to Cyclone. Our salesmen, engineers and metallurgists are thoroughly qualified to help you decide whether Flat Wire, Chain Link or the Flex-Grid type of belt will work best . . . which metal, alloy or finish will best meet *your exact operating conditions.* You are protected by Cyclone's enviable reputation for quality . . . by our 25 years of experience in making metal conveyor belts. Furthermore, all the facilities of United States Steel are at your disposal. There's a Cyclone salesman near you . . . offices in principal cities . . . factories in the Middle West and on the Pacific Coast. We will gladly send you our Catalog No. 3, on request. There is no obligation involved. Write us today.

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UNITED STATES STEEL

cars were overdried because of delayed scraping. Most of this overdried fruit could be packed at the required moisture content (20 to 25 percent) by blending with wetter fruit.

In general, the best policy is to pull cars at a moisture content of between 25 and 30 percent. This fruit is allowed to stand and cool for a few hours, after which it is scraped and temporarily stored in clean boxes.

Drying time is shortened with increased finishing temperature, increased airflow, even tunnel loading with sufficient time space between cars, low humidity at the exhaust end and small fruit and fruit low in sugar content. In 1944, when the fruit was relatively low in sugar, it was found in one plant that apricots could be dried in 9.5 hours to 25 percent moisture. The airflow was about 950 linear feet per minute, the finishing temperature, 150 deg. F., and the tunnel load never exceeded seven double cars per tunnel.

An example of a scraping line for plants with a large output is shown in Fig. 1. Fruit can be scraped at five places along the line, and is then dumped on a continuous belt and carried off towards the back. If necessary, it can be graded for serious defects at the end by a few inspectors. The empty trays return mechanically overhead in the opposite direction and are restacked on a car.

Table I also gives the retention of sulphur dioxide after dehydration under a number of average plant conditions. The ratio of the figures in the second column and those in the first column is called the "retention ratio." It is an indication as to whether dehydration took place under proper humidity conditions. While the retention ratio for dehydrated fruit averages 1.4, the ratio for sun-dried fruit is only 0.42.*

The increase in sulphur dioxide content (Table I) is, of course, only apparent, since the values are expressed in parts per million on the basis of the fruit as it is; namely, fresh fruit for the absorption values and dried fruit at 25 percent moisture content for the retention values. The apparent increase, therefore, means only that the loss of moisture was more rapid than the loss of sulphur dioxide. In sun drying, with a retention ratio smaller than 1.0, the reverse is true; namely, SO_2 escapes faster

*See page 45 of Bulletin No. 636, College of Agriculture, University of California.

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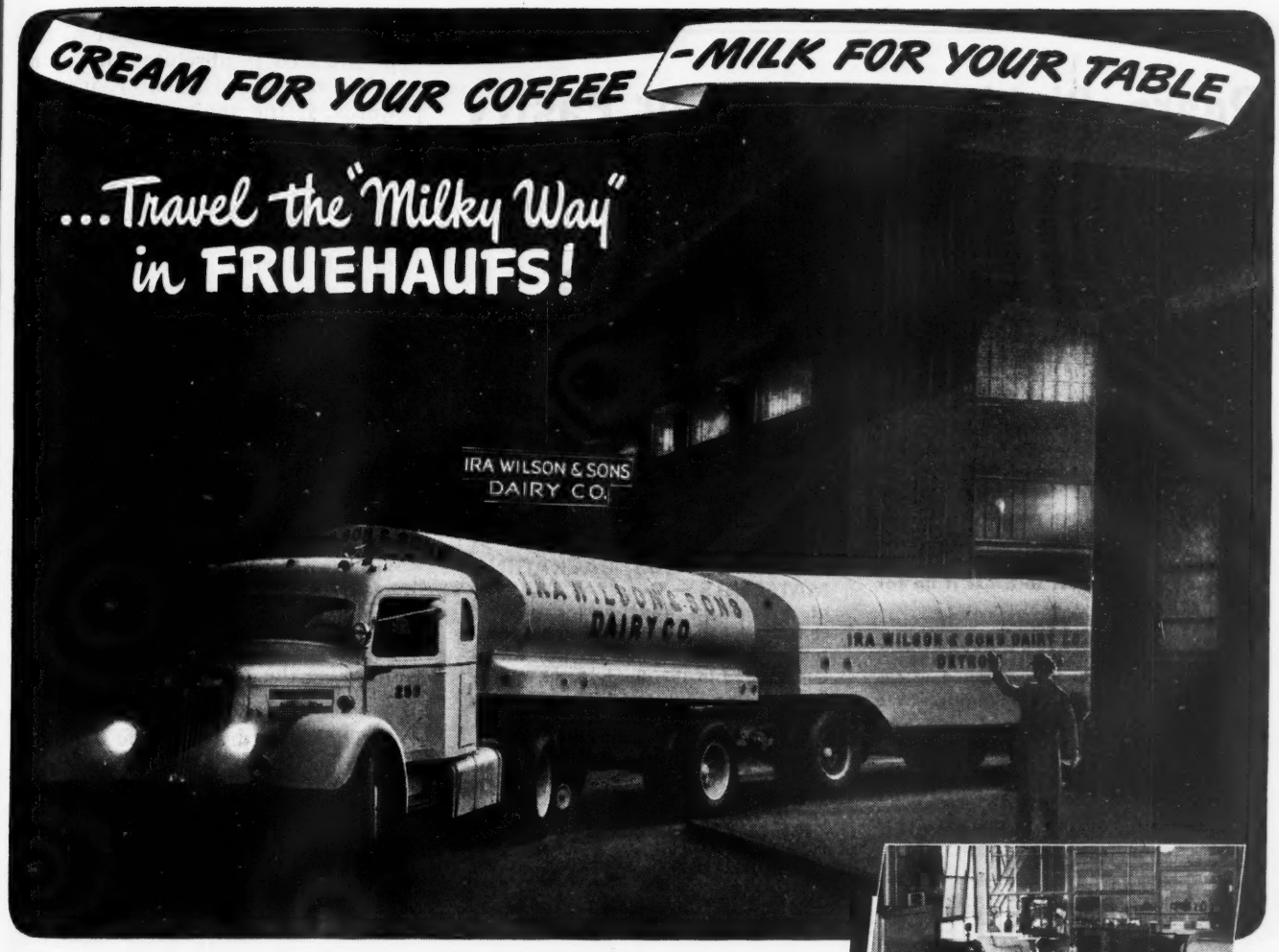
...Travel the "Milky Way" in FRUEHAUFS!



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LIKELY AS NOT, you think of your daily milk supply traveling to the creamery—as it did for years—in trucks loaded with bulky 5-gallon metal cans. But perhaps, in the early hours, you have seen big streamlined Fruehauf Tank-Trailers hurrying to the city, to start your milkman on his daily rounds.

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There are many advantages for Wilson customers. In using Fruehauf Tank-Trailers reduced delivery cost and savings in manpower help to hold the price of milk to a minimum. This giant "milk-wagon," with one operator, does the work of four smaller trucks and drivers. Loading and unloading time is cut—milk reaches the customer fresher—spoilage in transit is unknown.

Wilson's experience with Fruehaufs is typical of many other creameries. In fact, in more than 100 different types of business, Fruehauf owners have learned the flexibility and economies afforded by the Trailer-method—which in most cases does the job better than it could be done in any other way.

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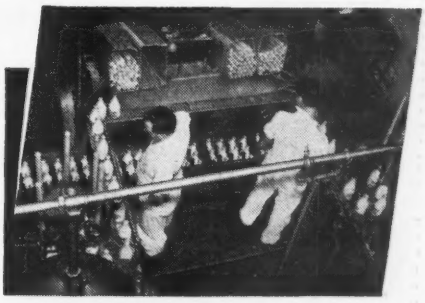

Movement of milk within the plant matches the efficient Truck-Trailer delivery. Bottles and store cartons are filled at the rate of 300 quarts per minute—for the milkman's wagon.

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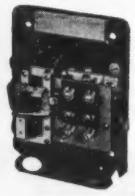

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than the moisture. A better picture is obtained if absolute sulphur dioxide values are used, or, in other words, if the analytical figures are converted to the moisture-free basis. Assuming that the original fruit had 15 percent solids and the dried fruit 75 percent solids, 28 percent of the original SO_2 is retained during dehydration and only 8 percent during sun drying.

It can be seen from Table I that properly sulphured and dehydrated apricots do not require resulphuring, as is customary with the sun-dried product. On long storage, the sulphur dioxide content drops slowly and resulphuring may be desirable. Since the fruit is not exposed to dry-yard contamination, processing with the purpose of cleaning is unnecessary. However, if the fruit is too dry prior to packing, a brief treatment in cold or luke-warm water may be applied to raise the moisture content.

Freestone Peaches

The dehydration of freestone peaches will be discussed only briefly, because the properties of freestone peaches are in many ways similar to those of apricots. The main differences will be stressed.

1. Because of larger size differences, the whole fruit should be size graded. This can often be done by the box. Large and small fruit should be handled separately through the plant.

2. The blanching time varies from about 4 to 7 minutes. Other factors to be considered in blanching are similar to those discussed under apricots.

3. Dehydration (to eliminate subsequent bleeding) should take place after blanching, but for a somewhat longer period, e.g., one hour.

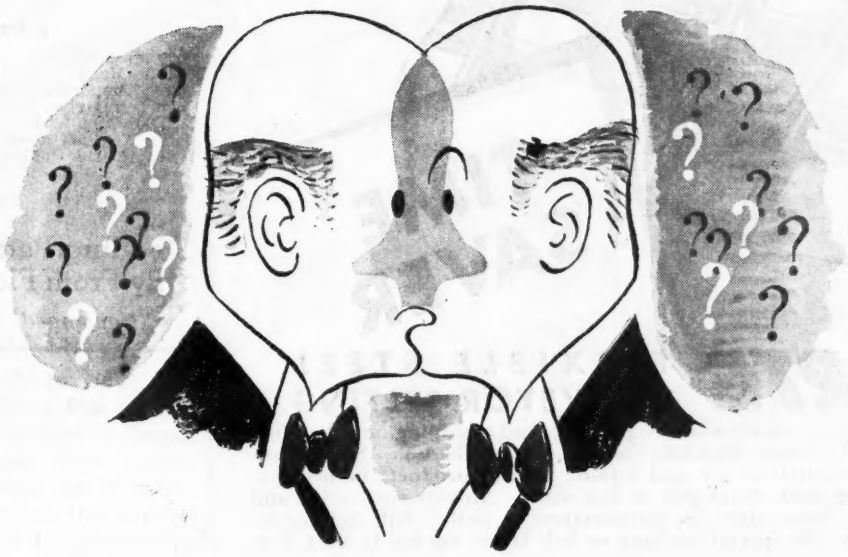
4. Sulphuring should be carried out for 4 hours. Five pounds of sulphur per single car of fruit may be suggested as an average figure.

5. Dehydration should take place in a countercurrent tunnel, with a maximum air temperature of 150 deg. F. The fruit should be dried to about 17 or 18 percent moisture content. Because of the tough skins and fuzz, processing is necessary to remove the fruit hairs and part of the skins. The lower moisture content allows for a certain amount of moisture pickup during processing.

Acknowledgment

The authors express their appreciation to Dr. R. H. Vaughan of the Division of Food Technology

QUICK QUIZ:



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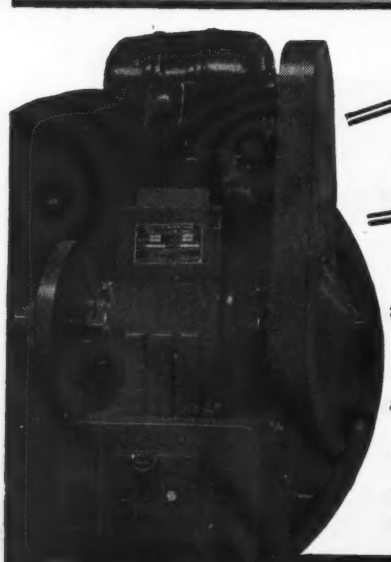

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for assisting in fruit temperature measurements, and to L. Dunham and E. Elvine, and their staffs of the War Food Administration, Processed Food Inspection Division, for valuable assistance in making analytical tests.

References

E. M. Mrak, H. J. Phaff, C. D. Fisher and G. Mackinney, Dehydration of Fruits Offers Important Wartime Advantages, Food Industries, vol. 15, 4, 59, 1943.

H. J. Phaff, R. L. Perry and E. M. Mrak, New Methods Produce Superior Dehydrated Cut Fruits, Food Industries, vol. 17, 2, 94, 1945.

Cleaning Peas By Froth Flotation

(*Continued from page 77*)

tion. The standpipe valves on the treater and auxiliary reservoir are closed as soon as the oil has been added. The separator standpipe valve is left open. Preparation requires only a few minutes. After preparation it is necessary to continue pumping to maintain the dispersion.

Sufficient detergent is required to accomplish emulsification, but concentration in the treater and auxiliary reservoir is not critical. Experience has shown that 6 to 7 g. of Orvus paste[4] for each 10 gal. of water is sufficient. Equivalent amounts of other sodium lauryl sulphate preparations may be used. Excessive amounts of detergent should be avoided in order to reduce foaming. The amount of detergent required in the separator fluid varies with the pump and must be continually adjusted during operation. It is therefore advisable to prepare this emulsion with about 50 g. of Orvus per 100 gal. of water and make the necessary additions during operation.

Oil concentrations are not critical for any of the emulsions. Because of the depletion of oil during operation, especially in the treater, it has been found advisable to prepare the treater and separator emulsion with 1 to 1½ gal. of oil for each 100 gal. of water. Most of the oil loss occurs in the treater, where the peas and foreign material acquire a layer of oil. Analysis of peas cleaned by the process, but unwashed and unblanched, showed that they carry about 1½ quarts of oil per ton. This amount includes oil held on the surface of the peas in droplets of emulsion and therefore must be considered as an approximate value.

[4]A technical preparation of sodium lauryl sulphate distributed by the Procter and Gamble Co.

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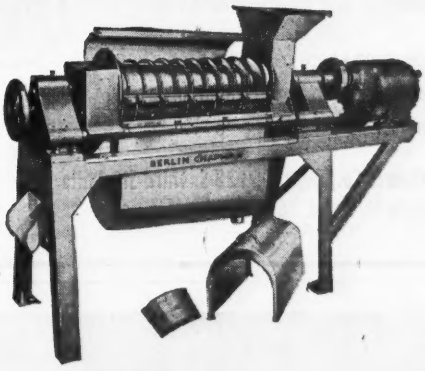

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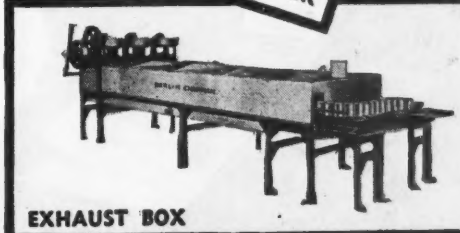

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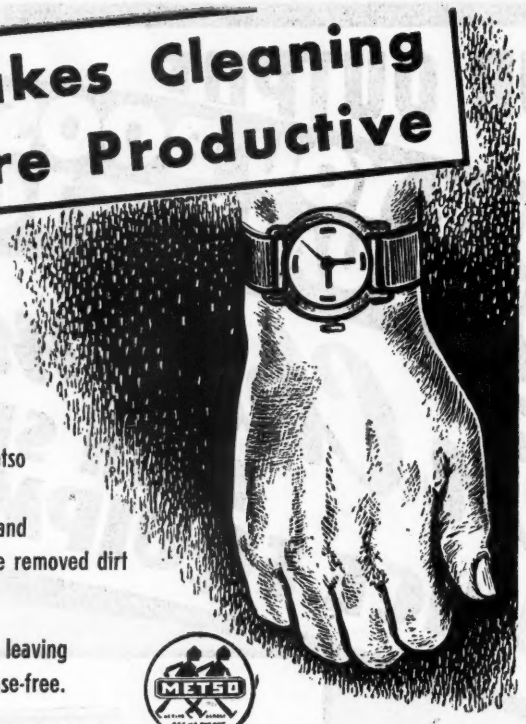

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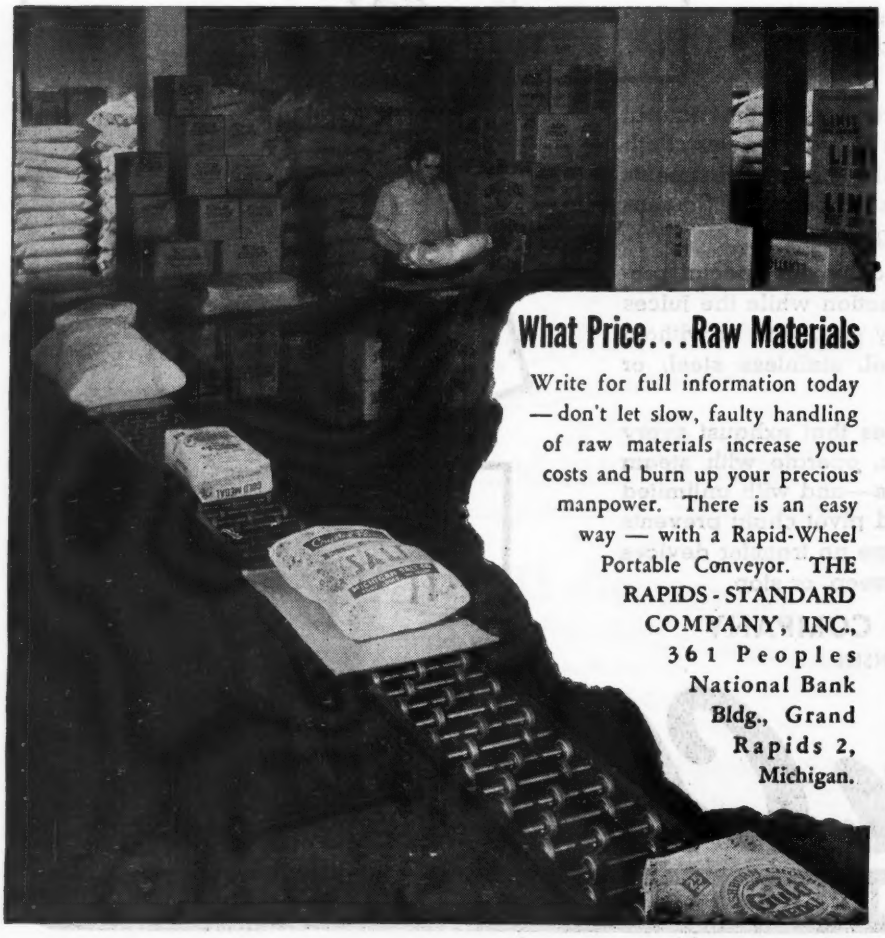

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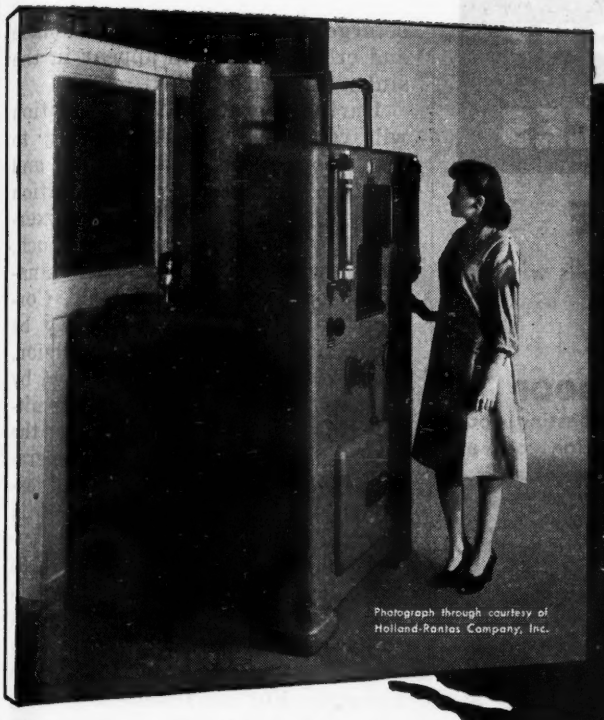
Loss of oil from the emulsion necessitates continual replacement during operation. This replacement is made, for the most part, to the treater. In operation, a portion of the treater emulsion is wasted, and fresh emulsion from the auxiliary reservoir is added to the treater to maintain the volume. To compensate for the dilution of the treater emulsion by water held on the peas, and also for oil removed by the peas, it was found necessary to use an oil concentration in the replenishing emulsion that was about twice as high as that used in the treater and separator. The continuous renewal of treater emulsion also served to prevent excessive contamination by pea juice on extended runs. Loss of separator emulsion was not large, because the treated peas entering it are wetted in the treater. This emulsion was satisfactorily maintained by addition from the auxiliary reservoir as needed.

Experience with loss of oil during cleaning indicated that fresh emulsion should be added to the treater at the rate of about 15 to 20 gal. of auxiliary reservoir solution per ton of peas cleaned. As previously indicated, the oil concentration is not critical and it is only necessary to avoid serious depletion of oil.

Operation of Equipment

The emulsion can be prepared and the machine set in operation in from 10 to 20 minutes. To avoid unnecessary power consumption, it is advisable to delay preparation of emulsion until needed, since the machine should be run continuously, once started, until the operation is halted. It is recommended that runs be limited to 6 hours' duration, to permit cleaning and the preparation of fresh emulsion.

When the emulsion has been prepared, a few peas are run through the process and separation is noted by observation of the floater and sinker discharge reels. If the emulsion has been properly prepared, practically all the peas and foreign material will be discharged from the floater reel. The separator emulsion is then adjusted by addition of detergent until the sound peas sink. By careful control of the detergent added, the operator regulates the separation so that a few sound peas appear in the floater discharge with the debris. This assures the operator that no nightshade berries are sinking and contaminating the cleaned peas. Should too much



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COST The Dorrco D-I System yields pure water at a fraction of the cost of distilled water; 2¢ to 20¢ per 1000 gallons (depending on the mineral concentration of the raw water). Compare this to costs of 65¢ to $8.00 per 1000 gallons for distilled water.

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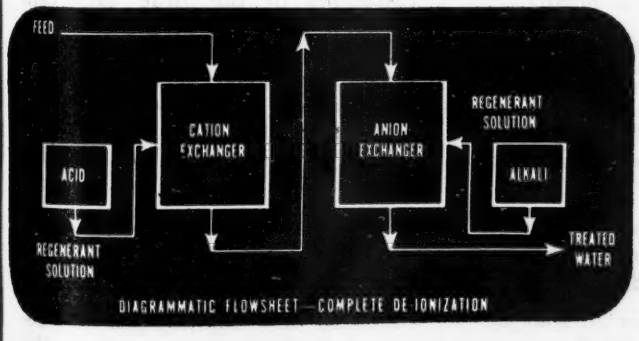

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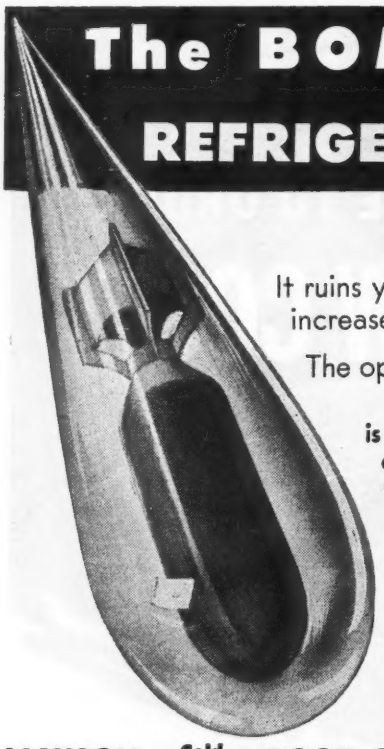

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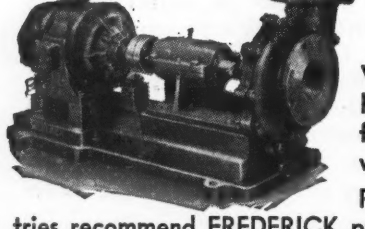

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detergent be added, nightshade and other debris will appear in the sinker discharge.

During operation, the separation will continually drift, tending to float both peas and debris, and must be regulated by the addition of detergent. Care should be exercised to avoid adding too much, which would result in contamination of peas with nightshade. Correction is difficult and it may be necessary to discard the emulsion. Some correction can be realized by addition of more oil or by permitting natural drift to bring the emulsion back by continued operation. Operators who have had experience report no difficulty in maintaining a sharp separation.

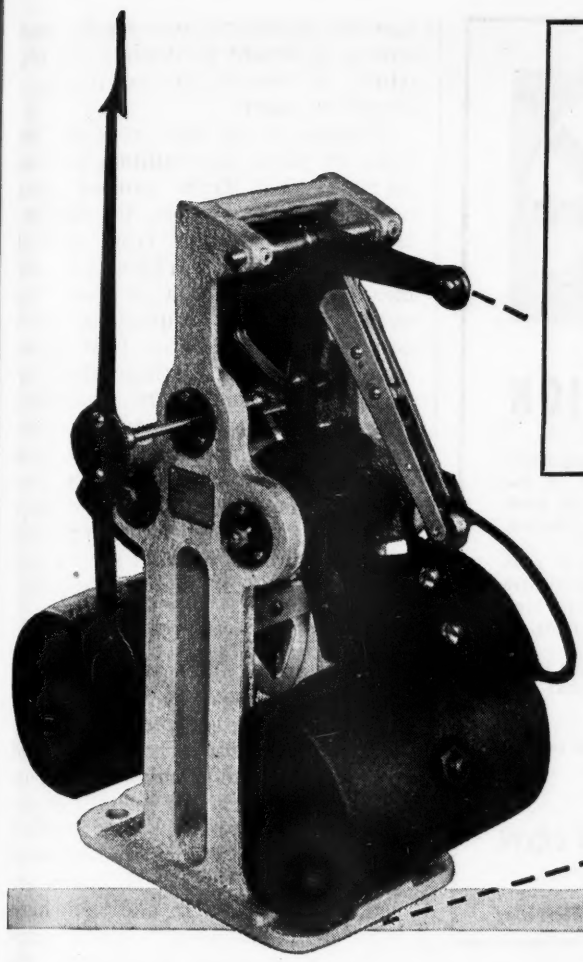
The addition of detergent can be made most conveniently to the separator reservoir, which assures a rapid response and minimizes the danger of adding excessive amounts. For convenience, a tank, pipe, and valve may be used. One pound of Orvus paste diluted with one quart of warm water gives a free-flowing, clear solution if its temperature is held above 80 deg. F.

Where the loss of sound peas in the floater discharge with the waste appears sufficient to justify salvage, recovery can easily be effected by feeding the waste into the treater hopper and permitting a second passage through the process. Floater waste free from sound peas results from this salvage with no loss in cleaning efficiency. In large-scale operations it may prove profitable to install a second, smaller separator at the end of the floater reel to salvage sound peas.

Operation of the froth-flotation equipment is not difficult and requires no special training. Three canneries in the Blue Mountain district, in which flotation equipment was operated during the 1944 season, reported satisfactory results after personnel had been given a demonstration of the process. It is necessary, however, for an operator to be in continual attendance.

Oil Residue

A considerable part of the oil covering the cleaned peas is removed by the water spray in the second section of the sinker-recovery reel. From this reel the cleaned, washed peas proceed to the blancher, where all but a trace of oil residue is removed. Both rotary and tubular blanchers appear to be effective in removing the oil, and the time and tempera-



SECRET WEAPON OVERCOMES HIDDEN COSTS

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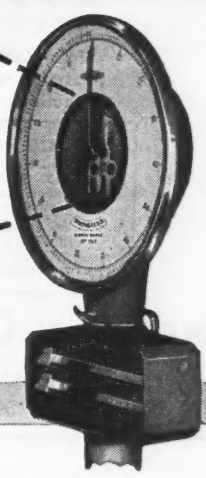

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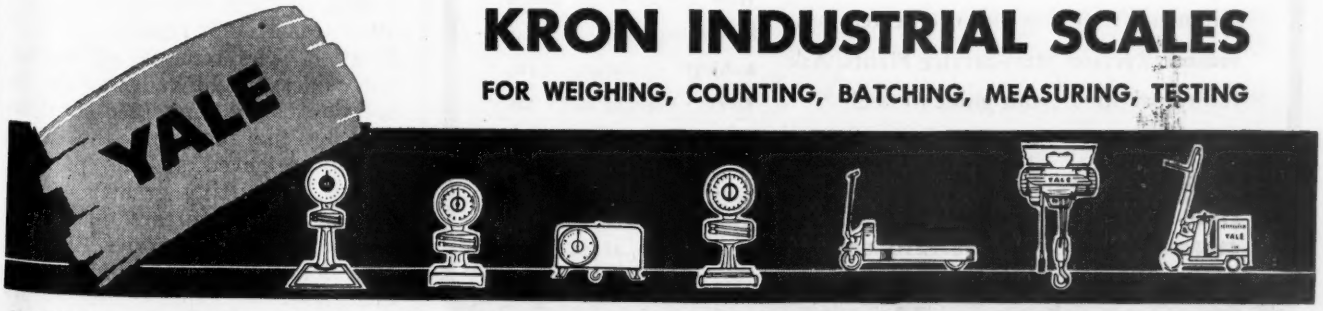
FOR WEIGHING, COUNTING, BATCHING, MEASURING, TESTING



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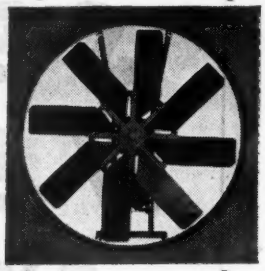

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ture of blanching commonly used appear sufficient to remove the oil, which is volatile in the presence of water vapor.

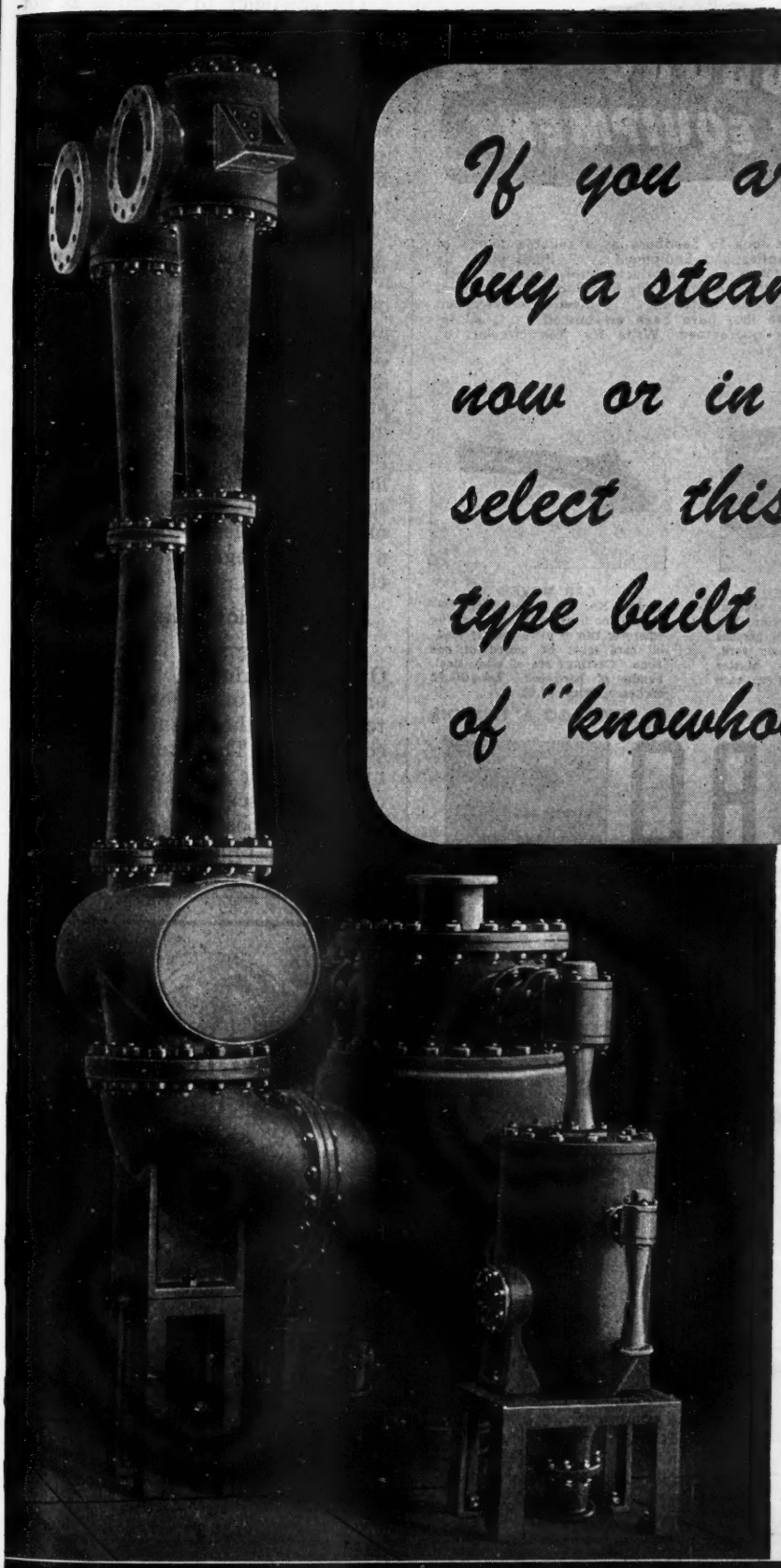
A trace of oil, estimated at less than 10 parts per million, can be recovered from canned peas cleaned by the process, by distillation of the contents from several No. 2 cans. Examination of cleaned, canned peas by pea canners and others acquainted with canned peas indicates that these peas cannot be distinguished by flavor or aroma from uncleaned peas. Care should be taken, however, to select an oil that has been deodorized as completely as possible. It is generally agreed that the appearance of peas is improved by removal of splits and skins, particularly in the small sieve sizes.

Efficiency of Cleaning

With proper attention, commercially vined peas cleaned by the froth flotation process, with the equipment described, are freed from skins, and a substantial portion of the cracked peas are removed. Nightshade berries that have retained their caps, tarweed seeds and dog fennel blossoms are removed entirely. In addition, most nightshade berries without caps are also removed. Ordinarily, the number of capless berries is small and very few remain after the cleaning process.

Occasionally, a lot of peas is found in which the proportion of capless berries is high. This appears to be true particularly when the nightshade plants become more mature. In such lots, although most of the capless berries are removed, a sufficient number remain to require further attention. The number of capless berries can be further reduced by recleaning the once-cleaned peas but the burden of removing the remaining berries falls upon the sorters at the inspection belts.

Hand sorting of the blanched peas on the inspection belt should be continued regardless of the treatment the peas have received. Certain foreign substances and off-color peas are not removed by froth flotation. The removal of remaining capless nightshade on the inspection belt is simplified considerably by the fact that the debris usually removed at this point is absent, permitting greater concentration by the sorters on the remaining capless berries. In any case, lots of peas containing large quantities of capless berries are infrequent.



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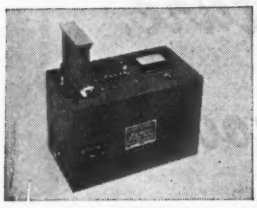

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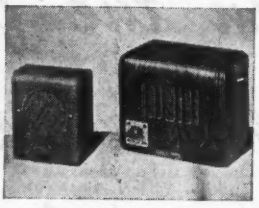

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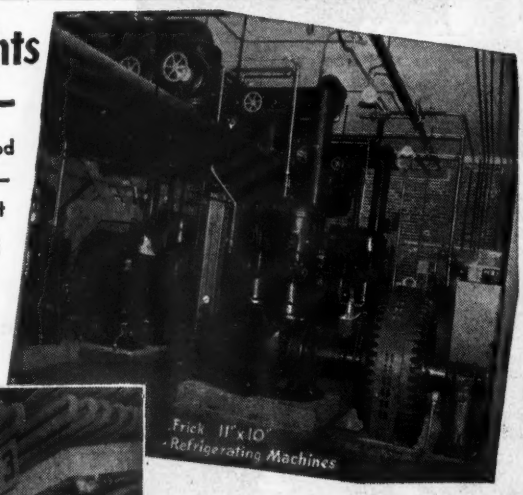

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The efficiency of cleaning is not affected by the degree of contamination. Whether or not peas can be cleaned profitably depends only on whether the peas in the mixture are sufficient to warrant processing. Lots containing as much as 25 percent of nightshade and other foreign material have been cleaned successfully.

The process as here described is not effective in removing thistle buds of the size and density that are left in the usual air and flotation cleaning. Preliminary experiments indicate that the wettability of thistle buds is not sufficiently different from that of green peas to permit selective bubble attachment under the conditions here described, and mechanical entrapment of bubbles is not obtained to a sufficient degree to make separation effective.

Acknowledgments

Acknowledgment is made to the Oregon-Washington Canners, an organization of pea canners formed to assist in these studies, for their cooperation. The Walla Walla Canning Co., Inc., permitted use of a commercial-scale unit for experimental purposes, and Libby, McNeill and Libby permitted pilot experiments in a commercial plant.

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